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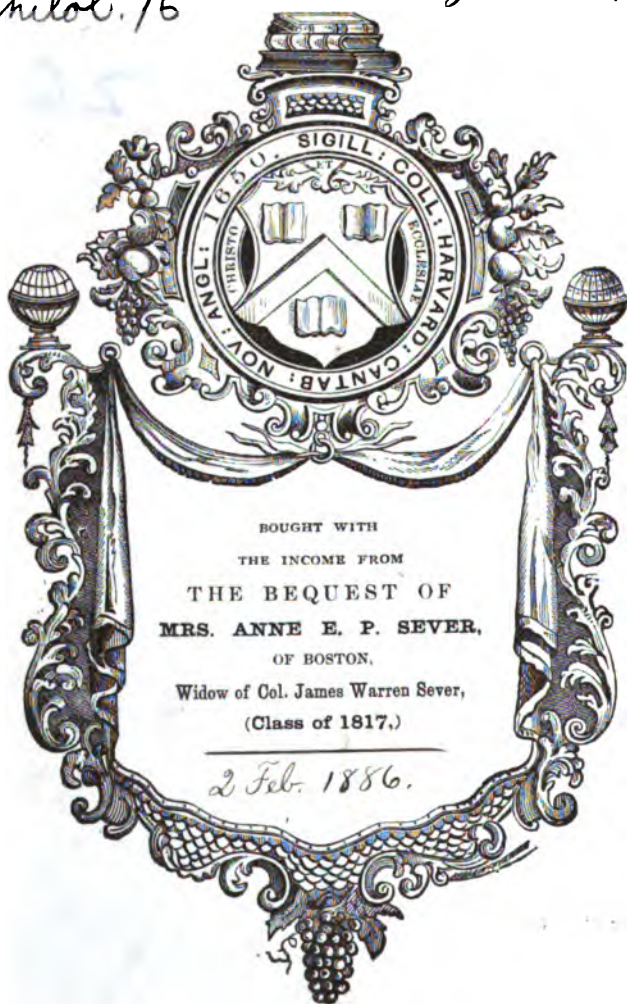
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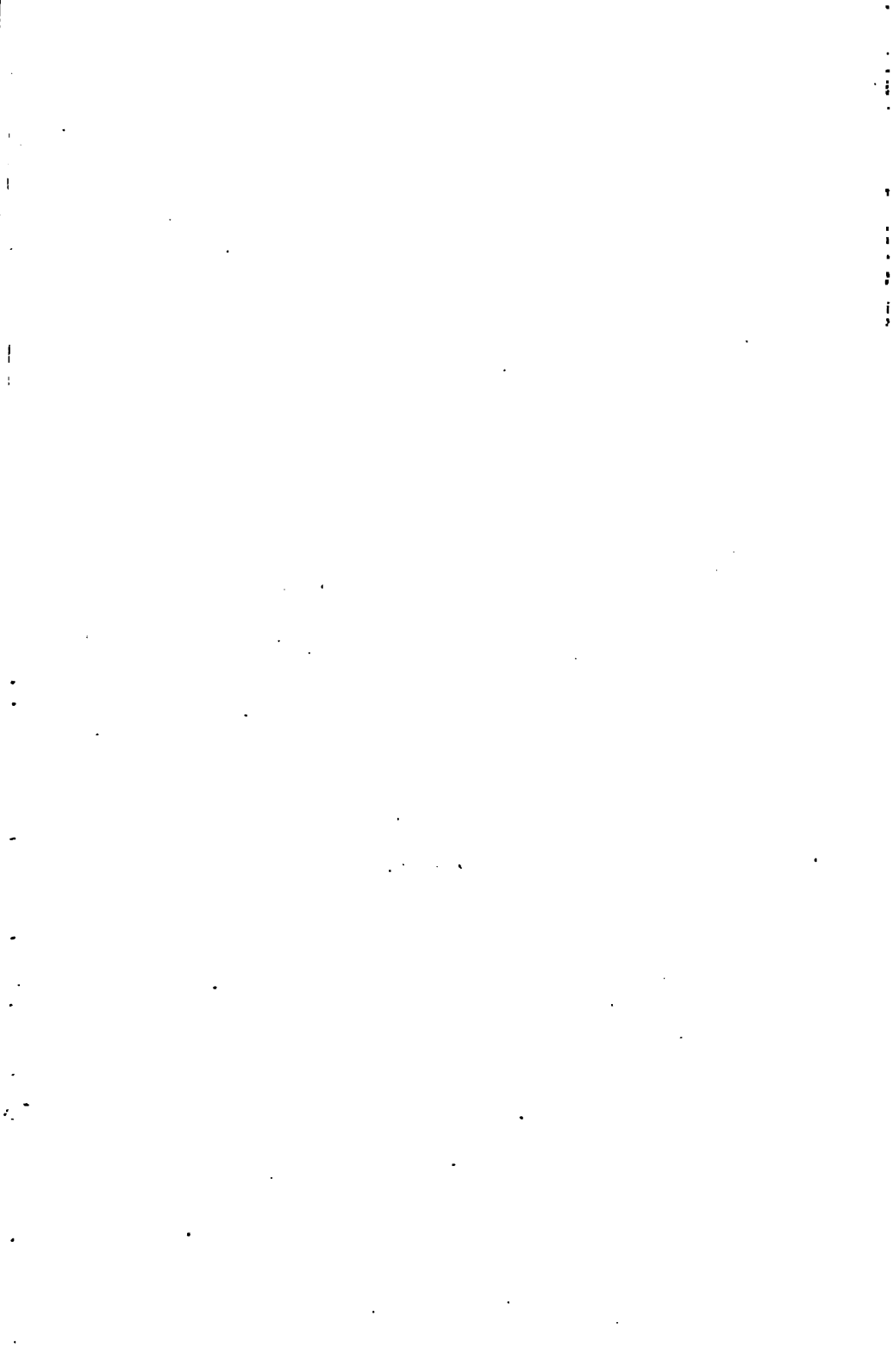
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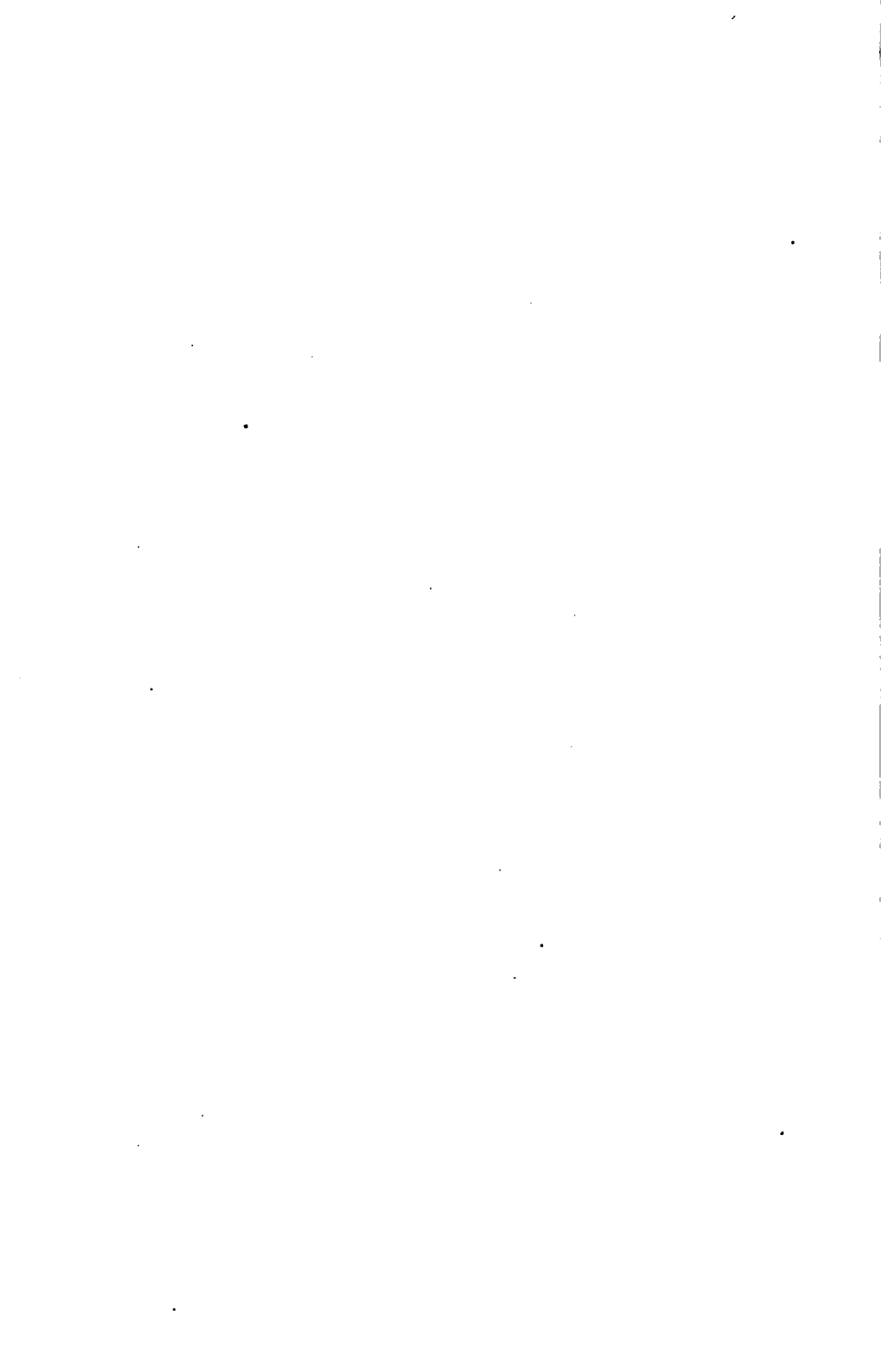
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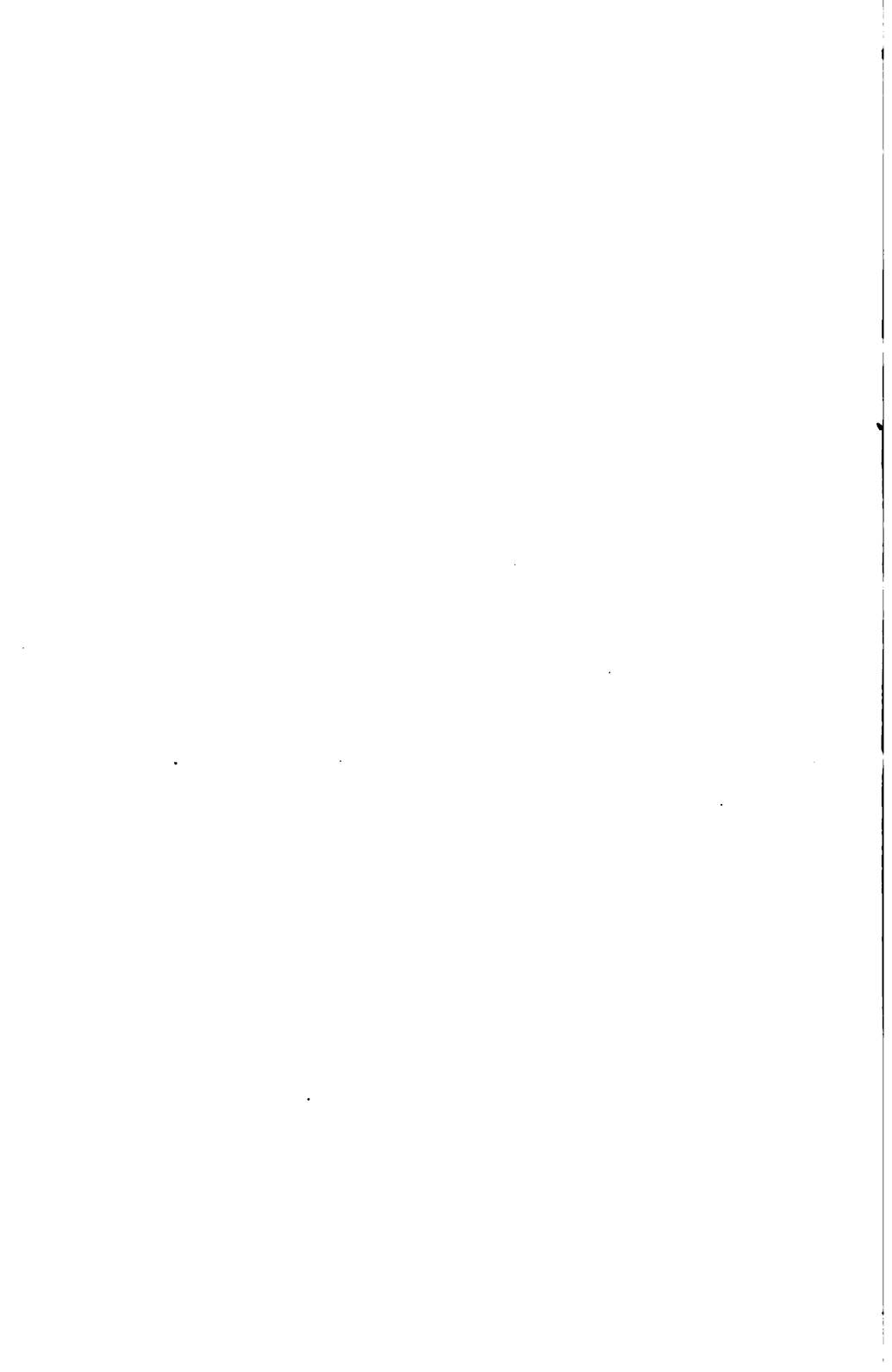




HERMATHENA:

A SERIES OF PAPERS ON

LITERATURE, SCIENCE, AND PHILOSOPHY.



HERMATHENA,

A SERIES OF PAPERS ON

LITERATURE, SCIENCE, AND PHILOSOPHY,

BY

Members of Trinity College, Dublin.

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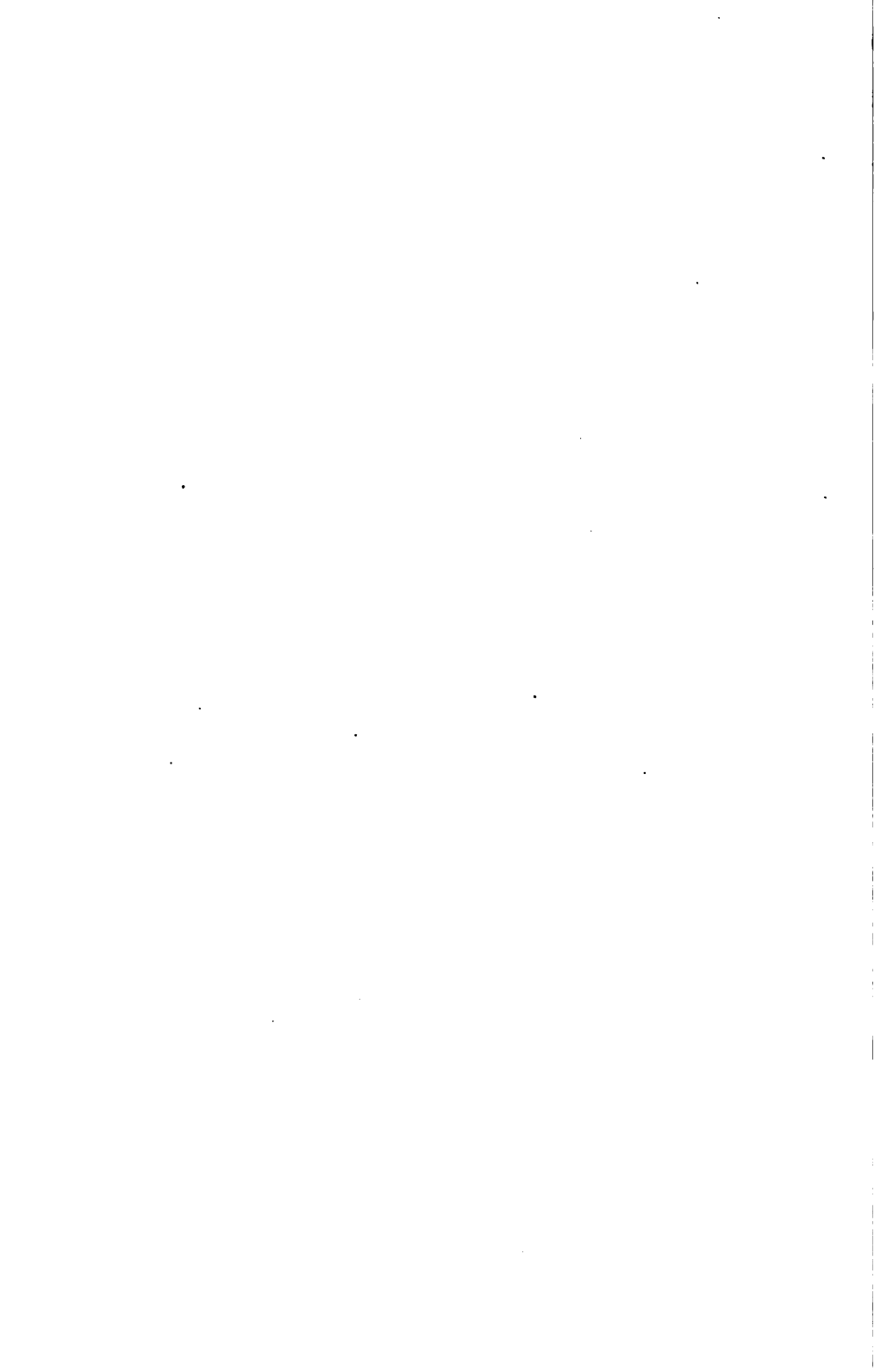
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HERMATHENA.

MR. MARGOLIOUTH'S *STUDIA SCENICA*.¹

MR. MARGOLIOUTH tells us that, 'if the restoration of the Greek tragic poets is ever completed, the lexica will have to be re-written' (p. 29 *n.*). He also holds that the Greek dramatists must be re-edited—which with him almost means re-written—to restore to them that 'simplicity, beauty, and grammatical accuracy' which has been 'marred at every line by the blunders of the copyist, and the more intolerable blunders of the interpolator' (p. 32). A little examination will show that, in the mind of Mr. Margoliouth, simplicity and beauty to a great extent resolve themselves into grammatical correctness. If, then, the main object is to restore the grammatical correctness of the tragedians, and if their grammar is in such a deplorable condition as Mr. M. maintains, we must either re-write the tragedians or re-write our grammars. I for one look on the latter alternative as the more rational and the more desirable. But I do not think we are forced to embrace either. The fact is, that Mr. M.'s views about grammar are far too rigorous. He demands absolute conformity to a strict and inflexible standard. Every sentence must

¹ *Studia Scenica*. By David S. Margoliouth, Fellow of New College, Oxford.

read as if it were a sentence constructed to exemplify some broad and general law of Greek speech. To illustrate what I have said, I may begin with Mr. M.'s first comment :

‘ Trach. 1.

λόγος μὲν ἐστ’ ἀρχαῖος ἀνθρώπων φανείς.

Either ἀνθρώπων or φανείς is without construction.’ But, we may ask, would the Athenian public have had the least hesitation about the meaning of the verse? Had Sophocles written

λόγος μὲν ἐστ’ ἀρχαῖος ἀνθρώπων

or

λόγος μὲν ἐστ’ ἀρχαῖος φανείς,

Mr. M. would have found nothing to object to; but Sophocles (fortunately) was writing without the fear of Mr. M. before his eyes. If Sophocles could not allow himself such latitude as this, how is it that Plato, writing to be read rather than to be heard, permits himself such an usage as ἔδοξέ μοι . . . σκοπῶν or ὑπάρχει αὐτῇ . . . διάγουσα? Mr. M. himself tells us (p. 24): ‘The Attic audience had no time to think out double or treble constructions, or to pick out agreements and governments. The plays were intended for the stage, not for the schools.’ This is very true: and one may even accept the inference which he draws from it that, in ‘reading the Attic Tragedians, we may be sure that anything which is difficult or awkward is corrupt.’ But the question necessarily arises, what is difficult or awkward? In my mind, this is difficult:

χρόνος δ’ ἐπεὶ πρυμνησίων σὺν ἐμβόλοις
ψαμμύοις ἀκμὰ παρή-
βησεν εὐθ’ ὑπ’ Ἴλιον κ. τ. λ.

This is Mr. M.'s presentment of *Ag.* 984. And to me it

seems awkward to speak of a leaf as 'full of food' = 'nourishing.' Yet Mr. M.'s conjecture on *Phil.* 43 is—

ἀλλ' ἡ 'πὶ φορβῆς μεστὸν ἐξελήλυθε
ἡ φύλλον εἴ τι νώδυνον κάτοιδ' ἐπον.

There indeed Mr. M. says, 'I propose with some diffidence'—a state of mind by the way which seems inconsistent with his reiterated principles of criticism¹; but on *Ag.* 413, he tells us that Aeschylus *wrote*

ἀπιστος ἐμφανῶν ἰδεῖν,

where the usual reading of a desperate passage is

ἀλγιστ' ἀφειμέναν ἰδὼν.

Now here he translates for us his reading—a practice which he might have adopted with advantage elsewhere, e.g. *Ag.* 1170, 1299, 1378; *Trach.* 115, &c.—and the words mean, according to him, *disbelieving facts which stared him in the face*. But what facts stared him in the face? The fact that his wife was absent, though 'such is Menelaus' affection that he still thinks she is there' (p. 16); but would it not be awkward (not to add obscure) to predicate ἐμφάνεια of the ἀφάνεια of Helen?²

¹ If an editor puts forward a view with diffidence, he may be supposed to hold that some other view is possibly right; yet we read (p. 43 n.), 'when two views of a passage are tolerated by an editor, both views are certainly wrong, the passage probably wrong, and the scholarship of the editor possibly wrong.' Mr. Blaydes, whose finished scholarship and genuine enthusiasm for learning must command the high respect of every scholar, and whom Mr. M. seems to regard as his ideal editor, has certainly not sanctioned by his example this hard saying. Perhaps Mr. M.'s

maxim refers only to explanation, not to emendation. Yet if a critic suggests several *readings* of a passage, must he not recognise more than one possible meaning?

² 'He distrusts what he had before him.' What had he before him? The fact that his wife was not before him. Moreover, the more natural prose form at least would be ἀπιστῶν τῷ ἐμφανεί, not ἀπιστῶν ἐμφανέσι. Very awkward, too, seems Mr. M.'s correction of O. T. 494, πρὸς θεοῦ δὴ βασάνου for βασάνου, where of course θεοῦ and βασάνου do not agree.

I fancy however (as I have already intimated) that by obscurity and awkwardness Mr. M. means non-conformity in minute details to the strictest views about grammatical usage. Now, this is the very thing which would not trouble an audience, provided the whole meaning was clear. For instance, *Trach.* 100 runs thus in most edd. :—

Ἄλιον Ἄλιον αἰτῶ
τοῦτο καρῦξαι τὸν Ἀλκμήνας, πόθι μοι πόθι μοι
ναίει ποτ', ὃ λαμπρᾷ στεροπᾷ φλεγέθων,
ἣ ποντίας αὐλῶνας, ἣ δισσαῖσιν ἀπείροις κλιθεῖς.

Mr. M. observes on this: 'Mr. Blaydes has pointed out that ἣ ποντίας αὐλῶνας κ. τ. λ., is ungrammatical, as it should be πότερον, εἰ, or εἴτε'. Hence he reads ἣ ποντίας αὐλῶνος κ. τ. λ., the gen. being governed by πόθι, a very clever and pretty conjecture—Mr. M. is undeniably an excellent scholar—but altogether unnecessary. For I cannot assent to his remark that 'ποντία αὐλῶν = *the sea* is clear, whereas the plural is not'; on the contrary, ποντίας αὐλῶνας seems an admirable description of the *interfusa nitentes aequora Cycladas*. As to the grammatical point, did the audience say 'this should be an indirect question; ἣ will not do; we demand our πότερον'? No; this is just what Mr. M. tells us they did not do; they did not ask what was the precise construction if the meaning was clear. And is not the meaning here perfectly clear? Could the sudden change to a direct question—ἣ (ναίει) ποντίας αὐλῶνας—give pause to anyone but a grammarian, nay, a grammarian who insists that Sophocles is as much bound to conform to his views about the most absolutely normal form of expression as are the pupils whose exercises the teacher corrects, and to whom he rightly says, 'this is the path; walk ye in it.' A greater difficulty in this passage, and left untouched by Mr. M., is that the Chorus asks, according to Mr. M., whether Heracles abides 'in the *two* continents,'

when they must mean, if bound to absolute strictness, 'in one of the two,' for he could not be in the two together. To tie down the poet's language to such precision would be, in my mind, false criticism; but I cannot see how Mr. M., consistently with his canons, can pass over the expression, unless he can show that *δισσαΐσιν* = *δυοῖν θατέρω*, which is, of course, impossible.¹

Thus it would seem that Mr. M. is resolved to surpass all the editors in limiting the elasticity of Greek modes of speech. It is curious that another Oxford editor of Sophocles, Prof. Campbell, has been fairly charged by Dr. Kennedy with exaggerating this elasticity, and conceding too much to *influence* as opposed to *government* in a Greek sentence. True criticism seems to lie in the just definition of the boundary line. Those who have helped most to perform this office are Porson, Elmsley, and their school—of whom Mr. M. speaks with very moderate enthusiasm (p. 32). The great Greek dramatists felt that grammar was made for man, and not man for grammar. The great Latin writers were largely slaves to their language, and gained some liberty only through their imitation of the Greeks. The great English scholars, from the revival of letters to the present day, have employed themselves in marking the limits within which was confined an easiness which never degenerated into license or caprice. It must be allowed that the Greeks (and even the Latins) used expressions which may be called negligent or vigorous according to the temper of the critic. When we say, 'do you think will it rain?' or 'he went away because he said it was late' (a form of laxity which is exactly reproduced by the Latin writers—see Mayor on Cic. *Phil.* II. § 7, l. 6), we know that we are using slipshod expressions, and we

¹ In *οὐκ ἂν δυοῖν ἤμαρτον* (which Prof. Campbell compares, alleging that there *δυοῖν* = *δυοῖν θατέρω*), the *δυοῖν* = no-

thing in the world but *δυοῖν*, 'I should not have missed the two'; that is, 'I should have gained one of the two.'

avoid and condemn such modes of speech, because printing has created a rigorous *norma*, to which we feel bound to conform;¹ but the best Greek writers used such expressions without any sense of violated obligation—that is, they allowed the general character of the sentence to influence the expression in a direction which led outside the strict laws of grammar. Thus Soph. wrote in *Ant.* 2—

Ἄρ' οἶσθ' ὅτι Ζεὺς τῶν ἀπ' Οἰδίπου κακῶν
ὁ ποῖον οὐχὶ νῶν ἐτι ζῶσαιν τελεί,

where *ὁ ποῖον* should in strictness be *ποῖον* (*ποῖον οὐχὶ* = *ἅπαντα*); but *ποῖον οὐχὶ* was loosely changed to the indirect form, through the influence of the general character of the passage, which conveys an indirect question. A similar account must be given of such usages as *ἔδοξε μοι . . . σκοπῶν*; and if the one explanation is allowed, so may the other. To read *ἀνάπαυλαν* for *ὁ ποῖον*, as Mr. M. does (p. 27), is to treat the verse of Sophocles like a pupil's exercise.² The abnormalities of grammar, however, are always significant, always correspond to some minute difference in the thought. When there is really a violation of grammar, the grammarian will be ready to protest. There is no probability that the grammarian will concede that *πλείστοι Σπαρτιητέων* means 'most of the Spartiates,' that *ἔξελεῖν* is 'to choose,' that *ἐκ τῆς δίκης* means 'on account of his decision,' or that 'τὰ stands for *αὐτὰ*,' views which have been put forward in a recent edition of three books of Herodotus.³

It would be out of place here to attempt to examine all, or even a large proportion, of Mr. M.'s emendations, which

¹ Even the English Bible has loose grammar, *Whom* do men say that I, the Son of Man, am? . . . *Whom* do ye say that I am.—Matth. xvi., 13, 15.

² Moreover, if *ἀνάπαυλαν* were right, it would be the only anapaest in a senarius in the *Antigone*.

³ See p. 13 *et seqq.* of this Number.

are between ninety and a hundred in number. It rather is my object briefly to consider his method. He says in his Advertisement: 'The present monograph will serve as a specimen of the method which the Editor intends to employ, and will enable scholars to judge whether he possesses any of the qualifications necessary for his task.'¹ If I, too, may give my judgment, I would say, in answer to this question, that Mr. M. has many admirable qualifications for his task, but his method is not one of them. His cleverest conjectures will be found to be where no conjecture was necessary. He has yet to produce emendations like *κάρει* in the *Medea*, and *λείοντος* *Ινιν* in the *Agamemnon*. And very possibly he may. But if he does, it must be by working on the methods which Porson and Conington used, and not on the principles which he propounds, but—here lies his chance—often neglects. I have already referred to one of those principles, 'that anything which is difficult or awkward or obscure is corrupt'; and I have tried to show that this is a very subjective criterion, and that perhaps the *obscure* has one meaning for him, and had another for an Athenian audience. Here is another principle, 'the language of the tragedians is averse to unusual words,' p. 22; and this is more strongly expressed on p. 23, 'the tragedians did not use obscure words.' This seems to threaten us with a very drastic treatment of the text of Aeschylus at least; but we are led to hope that mercy may, after all, temper justice, when we find that into *Trach.* 257 he introduces *ἀρχεῖρα*, a word which is not found at all. Yet *μάσσιν*, a suggested correction of *Phil.* 42, he condemns, on the principle that 'the language of the tragedians is averse to unusual words,' though it is not denied that the word has an existence in extant Greek. So again, though we are told that all the tragedians are

¹ The task is an edition of the *Poetae Scenici Graeci*.

'beautifully simple,' we find that Soph. has 'mannerisms' (p. 24, *n.*); that in *Ag.* 1173 θεσμοί bears the extraordinary meaning of 'the emblems or insignia of Cassandra's profession'; and—to crown all—that in *Ant.* 367 we should read νόμους παραίων, and interpret the words as meaning νόμους παράορος ὢν.

If, as Mr. M. labours in the most earnest manner and with the most emphatic words to prove (pp. 31–43), the plays of Aeschylus and Sophocles have 'a mistake in almost every line' (p. 31); if the Aeschylean *Scholía* are 'miserable,' and the Sophoclean 'absolutely worthless' (p. 40); if 'a manuscript is a necessary guide (why necessary?) but a most superfluous companion' (p. 44); if there is nothing certain but a good conjecture (p. 43, *n.*); if, as one may say, the copyists went about as roaring lions; how is it that anything has survived? How is it that Sophocles and Aeschylus are to us as different as any two modern writers who may fairly be compared? If there is a mistake in almost every line, how did it happen that all individuality was not effaced in a chaotic jumble? Τίς μηχανή μὴ οὐχὶ πάντα καταναλωθῆναι εἰς τὸ τεθνάναι?

Moreover, one is bound to ask, if the state of the text is as Mr. M. describes it, if the MSS. are far more likely to be wrong than right, and the scholiasts are sure to be wrong, what are we to do? Mr. M. answers, 'the remedy lies in the exquisite simplicity of those grand poets who rarely conceal from us *their actual words* when we ask them in the right way¹' (p. 44). My answer is, if the MSS. are so ab-

¹ 'When we ask them in the right way' conveys a certain suggestion of the pulpit. In the same tone one might say that German editors have a head knowledge, but not a heart knowledge, of the pause. They own the truth and value of the Porsonian canon, but they often forget to apply it in practice.

Mr. M. has adverted to the προῦμοσδον μὴ εἰδέναι of Madvig, and I have pointed out in a former paper that there is a violation of the pause in the passage preserved in Weil's Papyrus, which is pronounced by Continental scholars to contain no violation of the laws of Tragic metre. Indeed the hold which

solutely wrong in almost every line and word, and no ancient tradition is to be trusted, let us turn our attention away from the Greek dramatic poets, and apply it to some study which shall be useful at least, if not delightful. I certainly shall not content myself with waiting for some one to 'ask Sophocles in the right way,' merely to get such an answer from Sophocles as, 'I have used νόμους παραίων in the sense of νόμοις παράορος ὢν, but I am never obscure, and I do not use unusual words.'

If Mr. Margoliouth really acts on his method, his edition of the *Poetae Scenici* will, I venture to think, have very few readers. But, as we have seen, he is not likely to follow his own method very rigorously. He shows in his *Studia Scenica* great ingenuity and great learning, which bear abundant fruit when he works on the old methods, as he sometimes does, and pays due respect to the authority of the MSS. Among the most ingenious of his conjectures, in my mind, are πῆχυς for πύργος in Sept. c. Th. 763 (p. 41), τῷδε τᾶνδρε for τῷδε τᾶνδρῖ, O. T. 1140 (p. 8), δρ' for τὸρ', Trach. 166 (p. 13), ἄνω ταράσσει for ἀναταράσσει Trach. 217, vindicated by Soph. fr. 607 (p. 17), Συρλαΐσιν

the Germans have on the whole structure of the senarius has a tendency sometimes to slip. H. Cron, an excellent scholar, in his *Kritische und exegetische Bemerkungen zu den Troades des Euripides* (Zeitschr. für österr. Gymn. 1874), proposes on *Troades* 1171—

νῦν δ' αὖτ' ἰδὼν μὲν οὐ δὲ γνοῖς ψυχῇ, τέκνον,

which would be quite satisfactory if a spondee could stand in the fourth foot of a senarius. This conjecture is mentioned without disapprobation by Wecklein in Bursian's *Jahresbericht* for 1883. Again, in the Gymn. Progr. von Glogau, 1876, on *Hel.* 1301–1369,

Paulus Fischer suggests ἀγν' for ἀγνή, and supposes that a metrical equivalent for βαρέβρομὸν τε κύμ' ἄλιον is presented by χιονοθρέμμονας πέρασεν. I do not think it has been noticed in print, though many must have observed, that in the second edition of his Ovid, in *Metam.* xiii. 729—

Non apis inde tulit collectos semine flores—

Merkel actually prints *femine* for *semine*. In the face of these facts, is one altogether a βεκεσέληνος if one says that the practice of Greek and Latin versification is in some respects no disqualification in an editor of the Greek and Latin poets?

for εὐρείαις εἶν, Aesch. *Suppl.* 876, with the whole of the antistrophe to that strophe (p. 18, *note*); and πεσῆμαθ' ὧδ' ἀμείβομαι for πεσόντ' ἀγαθὸν δ' ἀμείβομαι, *Ag.* 1267 (p. 34); to which I might easily add instances of brilliancy and scholarship, especially, perhaps, in his comments on the *Trachiniae*. Other conjectures there are of much ingenuity, if the word ingenuity can be applied to the art of excogitating ingenious sentiments, which we have no reason for ascribing to the poet, except that Mr. Margoliouth tells us that he feels sure that the poet expressed them. These are always interesting to read and reflect on, but one cannot help hoping that Mr. Margoliouth will not publish them as the words of the Greek dramatic poets.

ROBERT Y. TYRRELL.

Dec. 3, 1883.

MR. SAYCE'S HERODOTUS.¹

MR. SAYCE tells us in his Preface that 'those who would be saved the trouble of reference to a grammar and dictionary, or who desire to learn what difficulties commentators have discovered in simple texts, and what avalanches of learning they have poured down upon them, must turn to other editions of Herodotus.'

In nearly every case where Mr. Sayce gives a note on the meaning or construction of a sentence, either that note is such as the grammar or dictionary would have readily supplied, or that note is erroneous or misleading.

Than the whole tone of the book I can imagine nothing more disagreeable. What can be more undesirable than to teach young men by example to flout a writer of venerable antiquity before they can even construe the language in which he wrote? Yet we find *passim* such comments as these: 'This is the only excuse for the deliberate falsehood in II. 29' (p. xxvii); 'a flagrant piece of prevarication' (p. xxviii); 'its (the Assyrian history's) disappearance is no great loss' (p. xxix); 'Herodotus stole his description' (p. 163); while on the next pp. 164, 5, each note is a separate jibe: 'contrary to fact'; 'this is absurd'; 'it does not neigh'; 'it is not cloven-footed'; and p. 179 we read, 'this gratuitous falsehood does not raise our opinion of the credibility of Herodotos in regard

¹ *The Ancient Empires of the East—Herodotos I.–III.*: with notes, introduction, and appendices. By A. H.

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to objects which he might have seen.' I cannot see why Mr. Sayce should read Herodotus, since it seems to make him so very angry; and still less can I see what end is served by printing comments which remind one of nothing so much as the pencilled criticisms on volumes lent out from a cheap circulating library.

With this aspect, however, of Mr. Sayce's work I do not mean to deal. I have only to make good what I have said about the character of his grammatical and exegetical comments.

This disagreeable task is, I think, in a measure forced on one. Mr. Sayce has won a very leading position in certain studies, which are by some looked on as branches of the study of classics. Younger students would naturally regard Mr. Sayce's reputation as a guaranty for the soundness of his teaching when he handles questions involving elementary accidence and syntax. I regret to have to warn such students that his teaching is the reverse of sound. The tone, moreover, which Mr. Sayce adopts concerning grammar is of one who has weighed this study in the balance, and found it wanting. He knows all about it, and sees that there is nothing in it. The following extracts from his work will, I hope, show that in the department of grammar he cannot be accepted as a guide, and that there is even reason for hesitation before we accept his views about the value of that study.

Some of the errors now to be pointed out have already been noticed by Mr. A. W. Verrall, in the *Cambridge Review* for November 7. But I have thought it better for the sake of the student to include them, too, in the list which I have furnished. To search for errors in the work of a scholar would be, I think, unworthy of a candid critic. I have not met any notes in this edition which seem to me to show a desire to treat the subject as a scholar should. The following are, in my mind, distinctly erroneous or misleading :—

I. 14. ὅσα μὲν ἀργύρου ἀναθήματα ἔστι οἱ πλείστα ἐν Δελφοῖσι, "most of the silver offerings at Delphi were his." This would require τὰ πλείστα. So again at I. 152 : ὡς ἂν πυνθανόμενοι πλείστοι συνέλθοιεν Σπαρτιητέων, "in order that most of the Spartiates might hear of him and come together," where Mr. Sayce shows himself as indifferent to the distinction between the present and aorist participles as he is to the distinction between πλείστοι and οἱ πλείστοι.

I. 16. αὐλοῦ γυναικείου τε καὶ ἀνδρῆιου, "flutes of men and women." The Greek words could not bear this sense. The passage in Aulus Gellius referred to in confirmation of this impossible interpretation, *Noctes Atticae* I. 11, 7, is *Alyattes . . . ut Herodotus in historiis tradit . . . feminas etiam tibicinas in exercitu . . . habuit*. Either Aulus Gellius was not referring to this passage, or he misunderstood this passage, or we should read in the passage of Gellius *femineas* or *femininas tibias*. These words would easily have been corrupted to *feminas tibicinas* by a scribe who did not understand the phrase of Gellius, and, like Mr. Sayce, was ambitious of being an editor.

I. 30. τοῦ βίου εὖ ἤκοντι. 'Εὖ takes the genitive, as being the neuter of the old adjective εὖς, i. e. ἔσους, Sanskrit *su-*, from the root of the substantive verb εἶμι.' How, then, is the genitive after ἤκειν to be explained when the adverb is καλῶς or ὁμοίως or πῶς?

I. 35, note 7. 'Adrastus, "he who runs not away," or, "may not be escaped."' Surely the first explanation is inconsistent with all we know of the usage of the word.

I. 39. τὸ δὲ οὐ μανθάνεις ἀλλὰ λήληθι σε τὸ ὄνειρον. "Now what you do not understand—but the (meaning of the) dream has escaped your notice." τὸ ὄν. cannot be a second accusative after λέλ., an otherwise unknown construction. Perhaps Herodotus wrote ἀλλὰ γάρ.' The comment shows that the editor did not understand the construction of the sentence. The student is misled.

I. 47. χαλκὸν δ' ἐπίσται. 'Ἐπίσται is from ἐννυμι.' It is from ἐφέννυμι. Mr. Sayce tells us, that 'those who would be saved the trouble of reference to a grammar and dictionary must turn to other editions.' His edition does indeed make reference to grammar and dictionary doubly necessary, because erroneous views are forced on those who would otherwise have consulted grammar and dictionary, and would have been saved from error.

I. 60. μηχανέονται δὴ πρῆγμα εὐηθέστατον, ὥς ἐγὼ εὐρίσκω, μακρῷ, ἐπεὶ γε ἀπεκρίθη ἐκ παλαιτέρου τοῦ βαρβάρου ἔθνεος τὸ Ἑλληνικὸν ἐδὲν καὶ δεξιώτερον καὶ εὐηθείης ἡλιθίου ἀπηλλαγμένον μᾶλλον, εἰ καὶ τότε γε οὗτοι ἐν Ἀθηναίοισι τοῖσι πρώτοισι λεγόμενοι εἶναι Ἑλλήνων μηχανέονται τοιάδε, "Seeing that ever since very ancient times the Hellenes have been distinguished from the barbarians by being." The meaning is, 'they resort to much the most silly device [ever used], as far as my research extends—*since the time when long ago* the Greek nation distinguished itself from the barbarians by its superior sharpness and freedom from silly simplicity—in thinking of playing off a trick like that in Athens, the most intelligent city in Greece.' The phrase ἐκ παλ. is adverbial; ἐπεὶ γε is 'ever since,' as often in Herodotus; ἐπεὶ τε is even more common in this sense; perhaps it should be read here: T and Γ are constantly confused.

I. 65. n. 8. 'Lycurgus, "expeller of the wolves" of anarchy.' Here, as in other places, when he drops a remark on etymology, the Deputy Professor of Comparative Philology seems to think that αὐτὸς ἔφα will settle the matter. Does ἀγαθοειργός, in the next chapter but one, mean 'expeller of the ἀγαθοί'? It surprises one, too, to read on p. xxxvii. of 'stems in εος.'

I. 68. ἐμισθοῦτο παρ' οὐκ ἐκδιδόντος τὴν αὐλήν, "who at first would not give it up." Ἐκδιδόναι means 'to let,' as Mr. Sayce's readers would have discovered, if he had kept

his promise of not superseding the use of dictionary and grammar.

I. 77. τὸν δὲ παρεόντα καὶ μαχεσάμενον στρατὸν Περσῆσι, δς ἦν αὐτοῦ ξενικός, πάντα ἀπείς διεσκέδασι. ‘Ὅς ἦν ξ. with the partitive genitive, is like ἡ πολλὴ τῆς γῆς, and similar phrases.’ But αὐτοῦ does not refer to στρατός; it refers to Croesus, and is the possessive, not the partitive, genitive.

I. 85. τὸ δέ σοι πολὺ λώιον ἀμφίς
ἔμμεναι.

‘Ἀμφίς, “all round,” and so “in every way.” The Homeric meanings, “on both sides,” and “apart,” are later.’ ‘Aloof, far from you,’ is the meaning, and the only possible meaning, here.

I. 86. τὸν ἄν ἐγὼ πᾶσι τυράννοισι προετίμησα μεγάλων χρημάτων ἐς λόγους ἐλθεῖν. “Whose conversation with every monarch I would prefer to abundant wealth.” Mr. Sayce possibly understands this sentence. But could a worse rendering be constructed? Not perhaps of this passage. But others afford some opportunity to an editor who is eager to show his contempt for the art of translation; *e.g.* I. 134 ‘in the time of the Median supremacy the several nations had the following precedence *over each other*’: here one expects to find an account of some ingenious system whereby A has precedence over B and C, while at the same time B has precedence over A and C, and C over A and B; but no, he means only (and seems to think he has said) ‘the following is the order of precedence among the nations.’ Hence we are not so much astonished as we might be if we suddenly came on this passage (p. 450): ‘the dead were buried, sometimes alive.’ Again, what is the meaning of ‘*in no way* much less than the rest of the body’ (II. 48, *n.* 2). But this is rather an error than a slovenly version; οὐ πολλῶν τιμῶν ἔλασσον does not mean ‘in no way much less’ any more than οὐ πολὺς τις στρατός means

'in no way a great army.' 'By stretching ropes he marked out 180 straight trenches' (I. 189) is another excellent specimen of the art of disguising uncertainty as to the meaning of a sentence. And so is 'repels it into the upper parts of the air' (II. 25, *n.* 3); and 'one of the walls of which should adjoin the external part of his palace' (II. 121 *a*, *n.* 1), and "'grow tired and begin to drag"—not, however, both together,' which is the editor's note on *παραλύεσθαι ἐπελκομένους οὐχ ὁμοῦ ἀμφοτέρους* (III. 105, *n.* 3). One would be glad, moreover, to know what is the meaning of 'having loaded it, the pass, with water' (III. 7, *n.* 4).

I. 153. *τοὺς Ἴωνας ἐν οὐδενὶ λόγῳ ποιησάμενος τὴν πρώτην εἶναι*. "Accounting the Ionians to be in no way his first object." The meaning is 'taking no account at all of the Ionians at first.' The translation given by Mr. Sayce is quite impossible.

I. 155. *κεφαλῇ ἀναμάζας*. On this word we have the following astounding note. Perhaps it is designed by such notes as these to discourage the study of classics, which Mr. Sayce despises so much. 'The phrase occurs in the *Odyssey*. *Μάσσω* is to "rub," "knead," hence "smear"; Skt. *mash* "grind small": *κεφ. ἀναμ.* is not "to rub off on the head," *i. e.* "to incur responsibility," but "to knead" or work up with the head,' instead of with the hands. It was the difference between thought-making and bread-making. Both here and in the *Odyssey*, therefore, the phrase means "what one will have reason to think of." This seems to me very like pouring an avalanche of (doubtful) learning on a plain text.

II. 3. *νομίζων πάντας ἀνθρώπους ἴσον περὶ αὐτῶν ἐπίστασθαι*. 'This may be rendered "considering that all people are convinced they ought not to be talked about." This affectation of religious scrupulosity on the part of Herodotus was probably a cover for ignorance.' The editor first mistranslates his author, and then sneers at him for having

said what he (the editor) ascribed to the author, not what the author said. So on p. xxv 'he ostentatiously asserts it was his *invariable rule* (see III. 115)'; now τοῦτο μελετῶν usually merely means 'aiming at this'; in III. 115 it means 'inquiring into this.'

II. 7. ὑπὲρ τε καὶ ἔνυδρος, "Flat and without spring water." In an edition which exhibited more marks of care and scholarship an error like this might perhaps be ascribed to the printer.

II. 58. προσαγωγάς. 'προσαγ. refers to the litanies and hymns which were sung to the sound of musical instruments.' It will be an exercise for students to conjecture what Greek word Mr. Sayce was thinking of when he wrote this note.

II. 63. τετράκυκλον ἄμαξαν, 'Chariots with four-spoked wheels characterise early Greek coins.' The whole character of the notes forces one to infer that Mr. Sayce believes that τετρ. ἄμ. means 'a chariot with four-spoked wheels.' One can only say to the student, 'Get thee to a dictionary, go!' He would have done so but for Mr. Sayce.

II. 125. ὥς τὸν λίθον ἐξέλοιεν, "when they had chosen the stone." ἐξελεῖν could not mean 'to choose,' which is ἐξελεῖσθαι.

II. 129. ἐκ τῆς δίκης, "on account of his decision." This is quite impossible. It means 'after,' as ἐκ τῆς θυσιῆς, I. 50, ἐκ δὲ αἰθρίης, I. 87.

II. 178. ὅσαι δὲ ἄλλαι πόλεις μεταποιεῖνται οὐδὲν σφι μετεὶδὼν μεταποιεῖνται, "All the other states which claim a share claim what in no way belongs to them." Οὐδὲν σφι μετεὶδὼν is the nominative absolute. Mr. Sayce appears to make it the object of μεταποιεῖνται. The note will at least suggest this erroneous view to the student.

III. 42. γράφει ἐς βυβλίον πάντα τὰ ποιήσαντά μιν οἷα καταλελάβηκε, "He writes in a letter all that had befallen him after having done it (τὰ for αὐτὰ)." The meaning is

‘all that he had done, and all that had befallen him’; lit. ‘having done what,’ τὰ being the relative; τὰ could not by any means stand for αὐτὰ.

III. 52. ταῦτα ἔόντα τῷ πατρὶ ἐπιτήδεον παραλαμβάνειν, “It is fit that you should inherit these which belong to your father.” The usual reading is to place a comma after ἔχω [in the sentence before], and understand ἔόντα of σὲ, “or that you should inherit this, my tyranny and prosperity, by behaving dutifully (being what you should be) to your father.” The latter view, which he rejects, is really the only possible one, as will be clear on a glance at the whole passage.

III. 65. οὐδὲν δεῖον, “Without need,” or (less probably) “contrary to right.” The rejected explanation is right.

III. 82. ἐν δὲ ὀλιγαρχίᾳ πολλοῖσι ἀρετὴν ἐπασκέουσι ἐς τὸ κοινὸν ἔχθρα ἴδια ἰσχυρὰ φιλεῖ ἐγγίγνεσθαι, “Violent private quarrels are apt to arise in a body which (collectively) governs the commonwealth wisely and well.” The passage is (literally) ‘among many practising public virtue private quarrels arise’; that is, ‘it often happens that private quarrels are engendered in an oligarchy, though the public action of the government is excellent.’

III. 108. λέγουσι δὲ καὶ τόδε Ἀράβιοι ὥς πᾶσα ἂν γῆ ἐπίμ-
πλατο τῶν ὀφίων τοῦτων εἰ μὴ γίνεσθαι κατ’ αὐτοὺς οἷόν τι κατὰ
τὰς ἐχίδνας ἡπιστάμην γίνεσθαι, “Unless I knew that to
happen in regard to them, which I knew,’ etc. . . We
cannot render “unless (they say) that happened in regard
to them which.” Why? As a matter of fact, γίνεσθαι de-
pends on a verb taken out of λέγουσι as surely as it does
not depend on ἡπιστάμην.

In the succeeding sentence Mr. Sayce strikes out γὰρ, remarking ‘though in all the MSS., γὰρ is unconstruable; ἔστι is not to be joined with εἰούσα.’ Now ἔστι εἰούσα = *est* is a well-recognised Herodotean construction, and so the γὰρ is not only ‘construable’ but indispensable.

III. 108. τὸ δὲ ἀναιρεῖται, "Others being conceived." The verb ἀναιρεῖν does not and could not bear any such meaning; ἀναιρεῖται = *tollitur*, and, like the Latin word, is a *vox propria* of newly-born children. Pindar has ἀνελών in this sense, P. IX. 61. ἀναιρεῖσθαι, middle, is also used in the same sense, e. g. *Ar. Nub.* 531 :

παῖς δ' ἑτέρα τις λαβοῦσ' ἀνέλειτο.

But here the verb is passive, like all the foregoing verbs, and we cannot assign to it any meaning which ἀναιρεῖν does not bear in the active. Ἀναιρεῖν, as applied to childbirth, only means *tollere*, 'to take up, own, acknowledge,' and so can only mean in the passive 'to be taken up'; ἀναιρεῖσθαι, middle, means both 'to take up' (*tollere liberos*) and 'to conceive,' as in Herodotus, VI. 69. Liddell and Scott here share Mr. Sayce's error.

III. 125. ἀποκτείνας δέ μιν οὐκ ἀξίως ἀπηγήσιος Ὀροίτης ἀνεσταύρωσε, 'The impaling describes the mode of death, which was one fit for a slave, not a free-born Greek. ἀποκτ. etc., is exegetical of ἀνεστ. and does not refer to a particular kind of death.' What the first words of this note mean I cannot guess, unless Mr. Sayce has confounded ἀπηγήσιος in some marvellous fashion with γνήσιος—hardly an incredible hypothesis in this edition. But the final words are plain enough. Mr. Sayce thinks that ἀποκτείνας ἀνεσταύρωσε means 'he killed him by impaling,' 'he impaled, and so killed him.' If Mr. Sayce had not been quite *supra grammaticam*, he would have seen that Oroetes slew Polycrates, and impaled his dead body. In this, as in other places, inattention to obvious grammatical distinctions falsifies or obscures a historical fact.

The reader to whom the criticisms which I have made appear just can hardly avoid making a certain reflection upon them. If Mr. Sayce so often fails to interpret aright the text of Herodotus—where, we think, we can form a judgment about the character of his work—does it seem im-

probable that his interpretations of Hittite or Accadian inscriptions will often be wrong—and there we have no independent means of testing his accuracy? To me it seems that such a reflection is well nigh forced upon one. But even if it be granted that he is able to bring to bear on these subjects an accuracy which deserts him when he comes to deal with Greek, are we sure that his inferences from his *data* will be always rightly drawn? Is he a trustworthy guide through a country unknown to us? Mr. Verrall has shown, in an able paper already referred to, that where we can follow Mr. Sayce, we find him to be by no means a careful reasoner; where, therefore, we are not in a position to examine his premises, we can hardly be expected to accept his conclusions. Two instances out of many which Mr. Verrall has brought together will suffice. On p. xxv we read: ‘The tale of the phoenix, which he plagiarised from Hekataeos, is a convincing proof how little he really cared for first-hand evidence, and how ready he was to insert any legend which pleased his fancy, and to make himself responsible for its truth.’ Now Herodotus concludes his tale about the phoenix with the words τοῦτον δὲ λέγουσι μηχανᾶσθαι τάδε, ἐμοὶ μὲν οὐ πιστὰ λέγοντες (II. 73). If these are words in which a writer ‘makes himself responsible for the truth’ of a story, will Mr. Sayce suggest some form of words to be used when a writer wishes to disclaim responsibility? Again, Herodotus tells us that cows were sacred to Isis (II. 41). Mr. Sayce’s comment is: ‘He confounds her with Hathor, to whom, and not to Isis, the cow was sacred.’ On p. 343, Mr. Sayce tells us that the cow was consecrated to Isis, and that Isis and Hathor are one and the same.

I will conclude by asking Mr. Sayce, as an Orientalist, is ‘dragomen’ really the plural of ‘dragoman,’ and would he write ‘Germen’ rather than ‘Germans?’

R. Y. TYRRELL.

Dec. 15, 1883.

NOTES ON CICERO'S LETTERS.

Q. FR. II. 3, 3 :

A. d. v. Id. Febr. ad Apollinis senatus consultum factum est :
EA QUAE FACTA ESSENT A. D. VI. ID. FEBR. CONTRA REMP. ESSE
FACTA.

On this Mr. Watson justly observes : 'but we should expect *a. d. vii. Id.* here, having no notice of any disturbances having taken place on *a. d. vi. Id.*' There were disturbances on the 6th *a. d. viii. Id.* and on the 7th *a. d. vii. Id.*, but there were none on the 8th *a. d. vi. Id.*

I propose, as an easier remedy, to read AD A. D. VI. ID. FEBR. 'up to the 8th.' The *codex medicus* often gives *ad* for *a. d.*, so that *ad* would the more easily have fallen out.

Ibid., § 4 :

Manus ad Quirinaliâ paratur : *in ea* multo sumus superiores ipsius copiis.

The italicised words are the reading of the MSS., but the edd. have with one accord changed them to *in eo*, which words are supposed to refer to the trial of Milo. But *ea* gives a better sense. The meaning is 'for it,' 'for the Quirinalia'; that is, 'for the struggle which is to come off on Feb. 17.' For the use of *in*, cp. *invitavit in posterum diem*, Off. iii. 58 ; *defectiones praedicuntur in multos annos*, Div. ii. 17 ; *venerat in funus* ('for the purposes of the funeral,' 'to take charge of it'), Att. xv. 1b, 1 ; so *in tempus conficta*, *in diem vivere*, &c.

FAM. V. 12, 5 :

Themistocli fuga redituque.

But Themistocles did not return. Yet this cannot be a *μνημονικὸν ἀμάρτημα* (though such are found, e. g. in *de div.* ii. 63, *Agamemno* is a *lapsus memoriae* for *Ulixes*), for Cicero in other places dwells on the fact that Themistocles did not return after his exile (*Brut.* 43 ; *Att.* ix. 10, 3 ; *Lael.* 42). It is quite impossible that in the word *reditu* Cicero refers to the fact that Themistocles was brought back to Athens after his death, and buried there, though this is referred to in *Brut.* 43. Now in the three passages quoted above he couples Coriolanus with Themistocles. It seems, then, probable that here Cicero wrote

Themistocli *fuga*, *Coriolani* fuga redituque.

If the copyist, having written *Themistocli fuga*, happened to raise his eyes from his task, he would mentally note that he was to resume it after the word *fuga* ; but if the word *fuga* occurred twice in the passage (the two being separated by only one word), the copyist would very probably resume the transcription of the passage after the second *fuga*, not the first. This is such a prolific source of the errors of copyists, that it would be desirable to have a term to denote it. Would *parablepsy* be a convenient term ?

FAM. VII. 1, 1 :

Neque tamen dubito quin tu *ex* illo cubiculo tuo, ex quo tibi patefecisti Misenum (*or* sinum), per eos dies matutina tempora *lectiunculis* consumpseris.

All editors have either changed *ex* to *in* or changed *lectiunculis* to *spectiunculis*. But the MS. reading as given above is right. What Cicero means is this : he had said

above that the leisure of Marius (gained by absenting himself from the games) would not be rightly employed unless he did something useful. Now to take 'little dips into books' might fairly be called useful as compared with dozing over hackneyed farces. *Spectiunculis*, 'taking little peeps' at the beauties of the bay of Naples would hardly satisfy this condition; again, *spectiunculis* is against the MSS.; finally, the word *spectarent* would not have been used after *spectiunculis*. Accordingly, nearly all the edd., retaining *lectiunculis*, change *ex* to *in* before *illo cubiculo*. But if Cicero wrote the easy *in illo cubiculo*, why do *all* the MSS. give us the difficult *ex illo cubiculo*? The fact is, that in *ex illo cubiculo tuo ex quo* we have an example of that *inverse attraction* which is common in Plautus, whose diction presents such marked parallelisms to the latinity of the letters: cp.

indidem unde oritur facito ut facias stultitiam sepelibilem.

Pl. Cist. 1. 1. 83.

ego te hodie reddam madidum si vivo probe
tibi quoi decretumst bibere aquam.

Aul. 3. 6. 39.

quid illum facere vis qui *tibi quoi* divitiæ domi maximæ sunt
. . . . numum nullum habes.

Epid. 3. 1. 8.

If this view is right, we have another striking example of the coincidence between the language of the comic stage, which was, no doubt, that of every-day life in Rome, and the language of Cicero's letters, of which he says *hodiernis verbis texere solemus*. A familiar example of this *inverse attraction* is in βῆναι κείθεν ὁθενπερ ἦκει, Soph. O. C. 1226.

ATT. IV. 13, 1 :

†Ergo et si irat† afuisse me in altercationibus, quas in senatu factas audio, fero non moleste.

The usual *medela* of the corrupt words is to read *ego ut sit rata*, and construe *ego* (vereor) *ut sit* (opinio) *rata* ; but, as we do not know what the *comitiorum opinio* was, it is hardly safe to ascribe to Cicero any sentiment concerning it. Perhaps Cicero wrote EGO, UT SITIO REM, ITA afuisse me fero non moleste. This would mean : 'I, though athirst for the excitement of the senatorial arena, yet am not sorry that I was not one of the combatants.' He goes on to say *nam aut defendissem quem non placeret aut defuissem cui non oporteret*.

Q. FR. II. 10 (12), 1 :

Pridie Idus, quum Appius senatum infrequentem coegisset, tantum fuit frigus ut *populi convicio* coactus sit nos dimittere.

Boot (*Obs. critt. ad M. T. Ciceronis Epistolas. Amstelodami*, 1880), justly observes that he does not understand how the consul was forced by the clamour of the people outside to dismiss the senate. He, therefore, suggests *communi convicio*. But this is too rash. Read PIPULO AC *convicio*. This refers to the clamour of the senators ; *pipulo* is a Plautine word, and might well occur here ; and it would be very likely to be mistaken for *populo*, which would then be changed to *populi*. The coupling together of nearly synonymous terms by a copulative conjunction is a marked feature in the letters : 'gewisse Eigenthümlichkeiten des Ciceronischen Briefstils, die starken Ellipsen und das häufige Setzen von zwei Synonyma' are the words in which an excellent authority¹ summarises the peculiarities of the epistolatory diction of Cicero.

¹ Paul Meyer, Untersuchung über wechsels Cicero ad Brutum. Stuttgart, 1881.
die Frage der Echtheit des Brief-

FAM. VII. 6:

Hoc tibi tam ignoscemus nos amici quam ignoverunt Medeae
quae Corinthum arcem altam habebant matronae opulentae optimates,
 quibus illa manibus gypsatissimis persuaserat ne sibi vitio illae
 verterent quod abesset a patria : nam

*multi suam rem bene gessere et publicam patria procul
 multi qui domi aetatem agerent propterea sunt improbi.*

The difficult passage, Med. 214 ff., beginning

Κορίνθιαι γυναῖκες, ἐξῆλθον δόμων,

has been explained in a number of different ways. But many as are the modern interpretations, none of them differ so widely from the others as they all differ from the meaning which Ennius and Cicero ascribed to the passage. These last, as is shown by the words of Cic. Fam. VII. 6, take Med. 214 ff. to mean : "you must not condemn me through any prejudice against those who leave their own country ; 'home-keeping youth have ever homely wits.' Remember," says Cicero to Trebatius, who, in the camp of Caesar in Gaul, is pining for Rome, "remember what the Medea of Ennius (and Euripides) says : 'I have known [travellers] to have gained much respect in private and in public, while easy-going (home-keeping) people have been despised.' "

Now it seems to me that the view in which Ennius and Cicero concurred has hardly had a fair hearing. The passage as understood by them is not inconsistent with the Greek. A good deal must be *subauditum*, but this is common to every interpretation of these verses. The greatest difficulty is this : Ennius and Cicero seem to take ἐξῆλθον δόμων as meaning, 'I left my father's home in Colchis,' and this is hardly possible. However, it might be taken as,

‘I have come forth from the palace’; and the whole passage, as understood by Ennius and Cicero, might be paraphrased as follows :—

‘Dames of Corinth, I have come out [to plead my cause with you]; think not little of me [as a foreigner]; I know many who have [left their own country, and in the country of their adoption have] gained high respect, some in private, some in public; while the easy-going [who remained at home], have got the evil report of sluggishness, for men’s judgments are shallow.’

- Medea goes on to admit that a stranger is under a special obligation to comply with the usages of the country of his adoption, and finally enters into the story of her wrongs. It seems, then, that if ἐξῆλθον δόμων could mean ‘I left [my father’s] palace,’ the view of Ennius and Cicero would be most coherent. But even if ἐξῆλθον δόμων means ‘I have come out of the house [to reason with you]’, I think this view is as good as any which has been put forward.

The last editor, Mr. Verrall, is dissatisfied with all the interpretations of the passage which have been given; and his own ascribes, I think, a rather trivial and not very relevant sentiment to Medea in the hour of her anguish. When an editor so brilliant and suggestive as Mr. Verrall has nothing really satisfactory to offer, one may well be diffident in putting forward another view. Yet it seems to me that the passage would cohere well if this were the train of thought: ‘Dames of Corinth, I have come out [to bespeak your silence, v. 262]. Do not blame me [for not remaining in the house and nursing a dignified sorrow]; for this might be taken for proud reserve, or careless indifference (men’s judgments are hasty); moreover, I as a foreigner was specially bound to avoid any misconstruction. But all these considerations are as nothing beside

my great grief. Of miserable women I am the most miserable. I am quite helpless. I do not ask you to help me. I only trust you will not betray me.' The only difficulty in the Greek which this involves is, that one must understand after the words *σεμνοῦς γεγῶτας* words such as *καὶ οὕτω δύσκληαν κτησαμένους*. But every attempt to interpret the passage rests on some supposed ellipse.

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SYMPOSIACA.

II.

HOMER, *Il.* VII-XII.IN *Iliad* IX. 437—

πῶς ἂν ἔπειτ' ἀπὸ σείο, φίλον τέκος, αὖθι λιποίμην
 οἶος; σοὶ δέ μ' ἔπεμψε γέρων ἱππηλάτα Πηλεὺς
 ἤματι τῷ ὅτε σ' ἐκ Φθίης Ἀγαμέμνονι πέμπεν
 νήπιον,

there is an example of how hard little children are to manage, both elsewhere, and especially in an epic poem. I have already remarked (*Aesch. Cho.* p. 97) how impossible it seems that Telemachus, left a child at the breast, *Od.* XI. 447,

ἦ μὲν μιν νύμφην γε νέην κατελείπομεν ἡμεῖς,
 ἐρχόμενοι πόλεμόνδε· παῖς δέ οἱ ἦν ἐπὶ μαζῷ
 νήπιος,

when Ulysses went to Troy, should recognize him with effusive demonstrations on his return, after an absence of twenty years. Apart from this, the scene of the ἀναγνώρισις, *Od.* XVI. 186-219, is very beautiful and touching.

If we give νήπιος the same meaning in the two passages quoted above, Achilles is only ten years of age when Phoenix pleads with him. The delay at Aulis might make him a little older; but it seems not easy to imagine him far on in his teens when he received that embassy, and had al-

ready done all those heroic things in the *Troad*. At the same time, it must be allowed that military genius and the art of getting people killed quickly on a large scale do not require many years of apprenticeship for their development. Hannibal was only 30 at the battle of Lake Trasimenus; Scipio, who was to be the first Africanus, was 32 at the battle of Zama; Alexander of Macedon was 25 at the battle of Arbela; Cn. Pompeius Magnus had earned and celebrated a Roman triumph at 25; the first Napoleon was First Consul at 30, and Arthur Wellesley had made himself famous at the same age.

This criticism applies to the Achilles of the *Iliad*; elsewhere he is a suitor of Helen, and father of Neoptolemus, before he came to Troy.

Virgil got himself into the same difficulty with Iulus. In the First Book of the *Aeneid* Iulus is a small child, fit to be taken on Dido's lap, and kissed while fondled in her arms. In the Third Book Andromache asks after him, as having been born before Troy was invested by the Greeks; for the complement of the line beginning 'Quem tibi iam Troia' would seem to be *florente est nixa Creûsa*, rather than anything else which has been proposed. But Virgil stopped short at 'Troia,' finding that he had not yet made out clearly how old the child Iulus was. In the retreat from Troy, *Aeneid* II., Iulus is big enough to hold on to the left hand of his father and keep up with him, *μακρὰ βιβῶντα*, 'at a sweep's trot' as they say. Then the wanderings of Aeneas take up seven years, and Iulus would be about 14 when Dido was dandling and caressing him. This, however, will not suit *Aen.* III. 491, where Andromache says that her lost Astyanax would have been of the same age as Iulus if he had lived. Now Astyanax, in the 10th year of the siege, was a *νήπιος αὐτῶς*, a *βρέφος* only carried in the arms of mother or nurse, and just beginning to 'take notice' of things, *νοῆσαι*, *Il.* 6. 470, or

αἰσθάνεσθαι, as Theocritus says of Praxinoë's babe, *Idyl.* 15. 14. According to this Iulus would be about 7 at least, and perhaps not much too big to be treated as a baby by Dido. In the Seventh Book Iulus rides a horse and shoots deer. In the Ninth he presides in a council of Trojan chiefs, and makes long and eloquent speeches to Nisus and Euryalus. He heads a sortie from the Trojan camp in the Tenth—all this only a year at most after Dido had him in her lap.

The last child whom Virgil ascribes to Aeneas, viz., Silvius Postumus, is introduced in such a way as to be a great stumbling-block to all careful readers: 'Silvius, Albanum nomen, tua *postuma* proles, quem tibi *longaevum serum* Lavinia coniux educet silvis,' *Aen.* 6. 762. The 'Postumus' is stated to have been found 'in omnium ferme annalium monumentis' in the sense of 'born after the death of Aeneas,' and clearly also as the only son of Aeneas by Lavinia. Then come 'longaevo' and 'serum.' Virgil was trying to introduce an equivalent for *τηλύγετος*, but the circumstances were not favourable. Less than four years before his death Aeneas had been greatly helped in winning the love of Dido by his charms of person—his golden hair, sparkling eyes, and ivory complexion with the bright rosy bloom of youth upon it, *Aen.* 1. 592. In *Aen.* 4. 141 he is 'ante alios pulcherrimus omnes' and a rival of the ever-young Apollo in beauty and graceful motion. The picture is that of a remarkably well-preserved young hero under 30 years of age. Grant that he stays the winter with Dido, 'nunc hiemem fovere,' *Aen.* 4. 193. Then, no Latin historian gives him more than three years in Latium; Cato, *Orig.*, quoted by Servius, makes the time less, and says he met his death in his second campaign, some little while after he had killed Turnus. Virgil incorporates these traditions in Dido's dying words, so as to give them the colour of true prophecies

uttered by a person at the point of death, *Aen.* 4. 618 foll. :—

‘ . . . nec cum se sub leges pacis iniquae
traderit, regno aut optata luce fruatur;
sed cadat ante diem, mediaque inhumatus arena.’

The *pax iniqua* is described *Aen.* 12. 190 foll., where Aeneas makes only one stipulation, ‘*sacra deosque dabo*,’ ‘I *will* impose on you my religion and my gods’; he allows them to retain their kings, laws, language, manners, and national dress, Serv. *Aen.* 4. 618. And so with all the rest of Dido’s ‘inspired’ words. No wonder that it should be asked ‘How came Aeneas to be *longaeuus*? and how could Silvius be *serus*, or *τηλύγετος*, born as he was so soon after marriage?’

All the critics were puzzled. Virgil would have changed it.

A. Gellius also records, X. 16, the anachronisms in *Aeneid* VI., to which attention had been called by Julius Hyginus, a savant of the freedman order whom Augustus made chief Librarian of the Palatine Library. Hyginus said that Virgil would have corrected them. One main quality of Virgil’s poetry is, that it pleases all and offends none: little, then, would he wish to give umbrage to antiquarians, among whom he was eminent for successful research. The first anachronism is VI. 366: ‘*portusque require Velinos*,’ about which the remark of Hyg. is: ‘How could Palinurus either know or name a harbour called from the town of Velia, which was founded by the fugitives from Phocaea, in the reign of king Servius Tullius? (*ab Harpalo fugati*, Teubner ed., ought of course to be *ab Harpago fugati*). This is not the same thing, Hyginus says, as when Virgil assumes on his own responsibility, *κατὰ πρόληψιν*, the existence of Lavinium, or an *arx Chalcidica*; for it is easy to understand him as saying, ‘Daedalus then

alighted on the hill *now called* "that of Chalcis"; but how is it proper to make Palinurus possess the knowledge of the Phocæan colony, Velia, 600 years before it was founded? and how could Aeneas know what place Palinurus meant?'

In the same Book (vv. 122, 393, 617) Hyginus: 'reprehendit et correcturum fuisse Virgilium putat, nisi mori occupasset,' Virgil's treatment of the myth about Theseus. For, v. 121, he quotes him as one who had gone with Peirithous to seize the queen Proserpina, and had effected his return in safety; whereas in v. 617 he is bound to a rock in everlasting punishment for that offence.

In 'eruet ille Argos Agamemnoniasque Mycenae, ipsumque Aeaciden, genus armipotentis Achilli,' VI. 838, 9, Hyginus says that this confusion of Manius Curius and L. Mummius Achaicus is so distressing that 'Virgil would without doubt have struck out the line about Pyrrhus Aeacides.'

Such oversights are inevitable in rough copies. The case is well stated by Favorinus, the most eminent philosopher and critic of his age, who, A. Gell. XVII. 10, reminds his hearers that Virgil himself compared his first draughts of verses to a bear's cubs which require to be licked into shape. The whole of this passage, *i. e.*, is very pertinent, judicious, and eloquent. The poet Cowper says in one of his letters: 'to touch and retouch is, though some boast of their negligence, and others would be ashamed to show their foul copies, the secret of almost all good writing, especially in verse.'

In *Il.* IX. 504:—*αἱ ῥά τε καὶ μετόπισθ' Ἀτρεΐδης ἀλέγουσι κιοῦσαι*, the difficulties are two, and they are very grave. There are *eighteen* passages in Homer where *ἀλέγω* and *ἀλεγιζω* occur, and *οὐκ* is attached to them in all but the above and one other. The negative is found even in the compounds *Οὐκαλέγων* 'Dreadnought,' and *ἀπηλεγιέως*, 'not

caring how it might be taken,' 'not mincing the matter.' It is exactly as in the Latin phrase *floci non facio*, which is not used without *non* in classical Latin.

The only other passage in which ἀλέγω is found without οὐκ, in Homer, is *Od.* VI. 268:—

ἐνθα δὲ νηῶν ὄπλα μελαινῶν ἀλέγουσιν.

Here ἀλέγω takes for once an accusative: the line is badly modulated; and μελαινῶν is badly placed. But we feel much more suspicion about the verse when we read *Od.* VIII. 555, *fol.*, where Alcinous says: 'But tell me of thy native land, thy people, and thy native town, that our ships, directing their course thither in thought, may convey thee home; for the Phaeacians have no pilots, nor any rudders at all, such as other ships have; but the ships know of themselves the thoughts and purposes of the people on board: they also know (where are) the towns and rich fields of all men, and very quickly make their way over the sea's watery plain, being veiled in thick air and cloud; nor is there ever any fear of their being hurt or lost.'

If the ships of the Phaeacians were of this kind, why should there be all these rope-walks, sail-cloth-weaving factories, ship-wrights' workshops, and the other appendages of an Athenian dockyard? I regard the vv. *Od.* VI. 264-273 as an interpolation which will be omitted from the context with advantage.

That being so, the ἀλέγουσι of the line, *Il.* IX. 504, requires to be able to plead that it is used, in an unprecedented manner, with singular propriety and felicity. The meaning as given in the well-chosen phrase of the best English Lexicon is, that the Prayers go 'walking with good heed' after Atè, and that is an unutterably absurd thing for Homer to say in this fine passage. I should like to read:—

αἱ ῥά τε καὶ μετόπισθ' Ἀτης λαλαγοῦσι κιοῦσαι,

‘who also go stammering after Atè.’ The cheeping and stammering comport with their lameness, their wrinkles, and their squinting eyes; all indications of the feebleness of excuses for sin, and of pleas for mercy.

I may remark here that *καὶ οὐκ ἀλέγιζεν ἐμεῖο*, Anth. Pal. v. 243 (by the consul Macedonius, 500–550 A.D.), means ‘did not mind my doing so-and-so,’ ‘was well pleased with it.’ Jacobs makes no remark.

If the root *ἀλεγ-* is to be used *without a negative*, *ἀλεγύνω* is the form used, *nine* times in Homer, in the same sense.

The Tenth Book of the *Iliad* is remarkable for its bad grammar and for the feebleness with which a good story is told. It is the only Book where riding on horses is mentioned in the *Iliad*, for the *ἀνὴρ ἵπποισι κελητίζειν εὖ εἰδώς*, *Il.* xv. 679, is evidently a professional equestrian gymnast or acrobat. In *Od.* v. 371 *κέληθ' ὡς ἵππον ἐλαύνων*, said of Ulysses astride on a plank of his wrecked ship, may also refer to a circus-horse. It is only in this Tenth Book that the spike at the butt-end of a spear, *σαυρωτήρ*, is mentioned, or the raising of trophies, or where a man's shoulder is called *λόφος*, *armus*, and the word *καταΐτυξ* found.

In v. 34 there was no use in adopting the form *τιθήμενον* when the thing could have been said clearly otherwise: *τιθήμενον* must be present for *τιθέμενον*; but Menelaus is already armed. Perhaps the pronunciation was, by special license, *τιθέμμενον*. In any case it is the wrong tense, as at v. 200.

In v. 200:—

*ἐν καθαρῷ, ὅθι δὴ νεκρῶν δι' ἐφαίνετο χώρος
πιπτόντων,*

which means ‘in a clear space, where a spot was seen through (i.e. in the midst of!) the corpses of the men killed yesterday, which (corpses) were still in the act of falling.’

πεπτεώτων might have been said, and Ἀργίους ὀλέσας in v. 201, to avoid the gross absurdity.

In X. 211 ταῦτά κε πάντα πύθοιτο the κε ought to be εἰ, ταῦτ' εἰ πάντα πύθοιτο, with consequence in μέγα κεν κλέος εἶη. In v. 246, for τούτου γ' ἐσπομένοιο we ought at least to read

τούτου χ' ἐσπομένοιο καὶ ἐκ πυρὸς αἰθομένοιο
ἄμφω νοστήσαιμεν.

The change ἐσπομένου καὶ κεν πυρὸς is inadmissible; for the verb νοστῆν is not once followed by the genitive in Homer (and only three times by ἐκ out of forty-seven places where the verb occurs). χ' is found for κε in *την* passages, the apparent cacophony being especially remarkable in *Il.* ix. 304, νῦν γάρ χ' Ἔκτορ' ἔλοις.

The passage X. 223, σύν τε δυ' ἐρχομένω, καὶ τε πρὸς ὁ τοῦ ἐνόησεν ὀππὺς κέρδος ἔρ' μῶνος δ' εἴπερ τε νοήσῃ, ἀλλὰ τέ οἱ βράσσων τε νόος, λεπτὴ δέ τε μῆτις, is an extraordinary specimen of versification. It has the same effect upon the mind as a negro's broken English. One sees what the writer wishes to say, but construing is out of the question, and adequate emendation would emend it all away. The case is similar in many other places of this Tenth Book which need not be specified.

βαμβαίνων, v. 375, seems to mean 'staggering,' as Hesychius gives for his first meaning, τρέμων τοῖς ποσὶ, and to be a reduplication of βαίνω, as παμφαίνω of φαίνω, *Il.* xi. 100. Compare v. 390, ὑπὸ δ' ἔτρεμε γυνῖα, also said of Dolon. βαμβαίνει also seems to me to mean 'staggers,' and not 'stammers,' in Bion 4. 7, where βαμβαίνει μοι γλῶσσα is opposed to ῥέει ᾧδά. There is no homogeneity of metaphor if you translate 'stammers' with Liddell and Scott.

In X. 394: ἡνώγει δέ μ' ἰόντα θοὴν διὰ νύκτα μέλαιναν, I cannot adopt Buttmann's chosen interpretation of θοὴ νύξ, 'the quick and fearful night.' νύξ of itself does not mean

'darkness' in Greek, whether verse or prose : it is only the correlative of *ἡμέρα*. The rule is to say, *νύξ καὶ σκότος*, or *νύξ σκοτεινή*, or *νύξ μέλαινα*, as above. Buttmann thinks no poet would call Night 'swift,' because it passes quickly and unperceived, for the most part, when people are asleep; but I think we shall have to conclude that that was the meaning *which the Greeks attached to the word*. This word has been very carefully and ably analyzed quite recently by Mr. Gladstone. He divides the meaning of *θούς* in a fourfold way, which I will adopt as a basis, but with different illustrations. Firstly, a tool like a hand-spike is 'sharp' and 'quick' when made to revolve rapidly, and bore a circular hole in a stone, by means of a strap looped round it, which is worked by two men. This is the *τρούπανον*, or 'borer,' of *Od.* IX. 385, worked by two men with a *ῥμάς*. This 'borer,' so worked, was called *mamphur* in Latin, which is probably a corruption of the Greek *μαννοφόρον*, 'wearing a collar,' that is, the loop of the strap.¹ So Scaliger on Festus, p. 132. Secondly, irascible and over-hasty persons are 'quick' in putting in their words, and 'sharp-tongued' in their remarks. Thirdly, Arès, and warriors generally, are 'quick' in assault, and 'sharp' with the spear and sword. Fourthly, a ship is 'quick' in motion, and 'sharp' with her prow. Mr. Gladstone observes that, out of 123 places where *θοή* is used in *Il.* and *Od.*, it is used of a ship in 101.

As to Night and the Echinad Islands, which are called *Θοαί* by Homer, and *Ὀξείαι* later on, Heliod. *Aeth.* v. 1. 17,

¹ Homer's *τρούπανον* and the Latin *mamphur* are called 'a jumper' in English, a cold chisel looped in a strap, and worked by two men alternately pulling, one on each side. The Latin for a 'brace-and-bit' is *terebra Gallica*, or 'Gallic auger,' the modern French being *vibrequin*, or *virebre-*

quin, and the 'bit' *la mèche*. Pliny, *H. N.* 17. 15, says that the *terebra Gallica* had in his time (H. N. pub. 77 A.D.) quite superseded the *terebra*, or wimble, as an instrument for piercing the holes in trees for the insertion of grafts. It is said that Galen called it *cycliscus*, *κυκλίσκος*.

after much eager attention in the inquiry, I incline to the opinion of Heracleides, *Alleg. Hom.* 45, which Buttmann rejected. Whoever was the maker of the really good and incomparable parts of the Homeric poems—the poet whom I call ‘the old Homer’—he must have travelled much in the earlier period of his life, as is implied in traditions about him. It pleases me to compare him to young Herodotus, who was already at Samos when 23 years of age, and at Athens, well advanced on his grand enterprise of discovery and enlightenment, at the age of 30. So I think that Homer must be describing his own voyages and travels very often when he ascribes them to Menelaus and Ulysses. Menelaus, Patroclus, and Eumaeus are Homer’s three favourites, whom he thou-and-thees. He makes his Menelaus moor his ships in the river ‘Aegyptus,’ and remain there for some time. If Homer was in Egypt himself in the course of his peregrinations, we can account for his use of several words, which he got the idea of in conversing, like Herodotus, with Egyptian priests who knew Greek. He there found the counterpart of the Greek *Herē* called *βοῶπις*, ‘cow-headed,’ and adopted it in a way not grotesque in the sense of ‘with a heifer’s eyes,’ as we say ‘with the eyes of a gazelle.’ *Athenē* was called ‘owl-headed.’ Homer turned this into ‘blue-eyed,’ *γλαυκῶπις*—for *γλαυκός* and *κυάνεος* mean ‘deep, bright blue,’ like that of a fine sapphire, except when they are used in the sense of ‘dark,’ ‘bluish-black,’ Latin *fulvus*, as opposed to ‘bright white.’ *ἡρωιδῆς* in the same way is *caeruleus*, ‘sky-blue,’ with the same limitation. Thus *ἡρωιδῆς πόντος*, *Hom. Il.* 23. 744, &c., is the same as *caeruleus pontus*, *Virg. Aen.* 12. 182, and Minnesota, ‘the sky-blue water.’ *γλαυκὴ θάλασσα* requires no verification. Gellius connects *caesius*, ‘blue,’ with *caelum* and *caeruleus*.

With regard to *κυανός* and *κυάνεος*, it appears to me that the student has not yet been clearly told that they

also mean 'sapphire-blue,' or 'hyacinth-blue.' Hesychius has *κυανόν* 'ἔδος χρώματος οὐρανοειδές, 'a sky-blue colour'; Philost: *Apoll. T.* 3. 50, *τὴν δὲ θάλατταν τὴν Ἐρυθρὰν εἶναι κυανωτάτην*, 'of the deepest blue'; Byron's 'purple of ocean is deepest in dye': a modern writer speaks of 'a sky of turquoise smiling on a sea of sapphire.'

Ennius and Pacuvius, and others, seem to have been rather reckless in the use of *fulvus* and *flavus*: 'fulva aquila' and 'fulvus vitulus' are readily understood as blue-black. To apply the same to *aurum*, *pulvis*, *iaspis*, *arena* is to become unintelligible. Ennius has 'mare marmore flavo; caeruleum spumat mare,' *A. Gell.* 2. 26; where one could understand *fulvo*, meaning 'a very dark blue,' or *furvo* (probably the same word as *fulvo*); for the Italian bluish-black cattle were also called *furvi*, 'uti Diti et Proserpinae hostiae furvae immolarentur,' Censorin. *de Die Natali*, 17. 8 (pub. in 237 A.D.). In passing, I may remark that *ferrugineus* means only 'steel-blue,' and is, with *caeruleus*, the colour of mourning. Charon's boat is of that colour, *Aen.* 6. 303, and the shroud which the sun assumed on the death of Caesar, *Georg.* 1. 467. The *vittae*, or streamers, tied over the tomb of Polydorus, *Aen.* 3. 65, are *caeruleae* (there is a lacuna after v. 66). Blue is still the colour of mourning in Persia and elsewhere. In the same author, *A. Gell.* 18. 11, 'spiritus Eurorum virides cum purpurat undas' is easy, 'when the breath of south-east breezes gives their deep-blue tint to waves that were green before.' The examples of *fulvus* meaning 'blue-black' are important as supporting its affinity with 'blue,' 'bleu,' 'blau,' which seems to be in accordance with the laws of change.

The Greek *ὑάκινθος*, Latin *vacin-ium*, 'hyacinth,' O. Eng. 'watchet,' is *κυανὸν ἄνθος*, 'the blue flower,' and also 'the sapphire,' or 'hyacinth-stone.' The Hebrew word 'saphir' was not adopted, as possessing no meaning of its

own to a Greek. Martianus Capella, i. 67, speaking of jewels, has 'flucticolor hyacinthi profunditas,' 'the sea-wave-coloured deep-blue of the sapphire.' Anth. Pal. ix. 751 (Πλάτωνος νεωτέρου),

ἡ σφραγὶς ὑάκινθος· Ἀπόλλων δ' ἐστὶν ἐν αὐτῇ
καὶ Δάφνη· ποτέρου μᾶλλον ὁ Λητοΐδης;

'the stone of the signet ring is a sapphire. The form of Apollo is engraved upon it, and that of Daphne. To which of the two does the love of Leto's son rather belong, to Hyacinth or Daphne?' 'Apollo's chlamys is of the colour of the hyacinth whenever he is represented by the Greek and Italian painters as wearing one,' Winckelmann. I will also translate a few lines of the very beautiful sonnet of Paulus Silentarius, marked ὠραῖον! twice in the MS., Anth. Pal. 5. 270: 'The rose needs no crown, nor dost thou, my queen, need robes and hair-nets studded with precious stones. Pearls come not near thy complexion, nor does gold bring with it the brightness of thine uncombed tresses. The Indian sapphire (ὑάκινθος) has the grace of a brilliant lustre, but it is much dimmer than the glances of thine eyes.' (Read γληνῶν instead of the λογάδων which is read in Jacobs and Tauchnitz, J.F.D.) When Ibycus (about 530 B.C.) and Pindar wish to unite, as above, the blue eyes to the golden hair, they say, Ibyc. *Fr.* 15, Schneidewin, γλαυκῶπιδα Κασσάνδραν ἐρασιπλόκαμον, 'blue-eyed with lovely curls or braids,' and Pind. *Nem.* 10. 11, ξανθὴ γλαυκῶπις, 'the yellow-haired with eyes of blue.' The Euryalus of Ibycus is 'γλαυκῶν Χαρίτων θάλας, καλλικόμων ['Ὠρέων] μελέδημα,' *Fr.* 4, Schneidew., 'a blossom reared by the blue-eyed Graces, the darling of the fair-haired Hours.' I insert the Ὠρέων from my own conjecture: it is required by the metre, and was dropped after ων: compare σῶμα καὶ ἀκμὴν εἰαρινῶν Ὠρῶν, Anth. Pal. 5. 70; Ὠραὶ σοι Χάριτες τε, *ib.* 12. 38. The Graces and the Hours,

along with Venus, are the types of beauty, and therefore 'are alone represented nude in ancient sculpture and painting,' Winckelmann. Compare passages like Apul. *Met.* 10. 32; 6. 24: 'hinc Gratiae gratissimae, inde Horae pulcherrimae,' and 'Horae rosis purpurabant omnia, Gratiae spargebant balsama,' at the marriage of Cupid and Psyche.

Once more, Ibyc. *Fr.* 2:—

Ἔρος αὐτέ με κυανέοισιν ὑπὸ βλεφάροις
 τακέρ' ὄμμασι δερκόμενος,
 κηλήμασι παντοδαποῖς ἐς ἀπείρονα δίκ-
 τνα Κύπριδος εἰσέβαλεν

(two septenarian anapaestics), 'Eros, once more, looking at me meltingly with blue eyes under his lids, by means of all sorts of fascinations, flings me into the impassable nets of Cypris.' It is the 'iris,' ἶρις, round the 'pupil,' κόρη, which is blue (the bright part of the κόρη being γλήνη), and not the βλέφαρα, 'eyelids'; but Ibycus describes the thing correctly, because the general effect of the eye, especially at some little distance, is that of brightness and blueness blended. In Pliny, *H. N.* 11. 37, 'aliis glauci coloris orbibus circumdatis' is 'having the pupil girdled with blue irises.' (Pliny uses *genae* only as meaning *palpebrae*, 'the eyelids,' and says 'malas, quas prisci genas vocabant,' 'a former generation used to call "the cheeks" *genae*.')

So I reject for γλανκῶπις the other interpretations 'lion-eyed,' 'fierce-eyed,' 'grey.' The passage referred to by L. and S., in support of 'fierce-eyed,' is as follows, Paus. 1. 14. 5:—τὸ δ' ἄγαλμα ὁρῶν τῆς Ἀθηνᾶς γλανκούς ἔχον τοὺς ὀφθαλμούς, Λιβύων τὸν μῦθον ὄντα εὕρισκον. τούτοις γὰρ ἔστιν εἰρημένον Ποσειδῶνος καὶ Λίμνης Τριτωνίδος θυγατέρα εἶναι, καὶ διὰ τοῦτο γλανκούς ὥσπερ καὶ τῷ Ποσειδῶνι ὀφθαλμούς— 'when I saw the statue of Athenè (at Athens) to have blue

eyes, I understood at once it was an Egyptian tradition ; for they say that Athenè was the daughter of Poseidon and Tritonis ; and therefore her eyes are blue, like those of Poseidon himself.' It is not likely that Ibycus (in the middle of the 6th century B.C.) was mistaken about γλαυκός meaning 'blue,' and, as above said, 'nothing else.' If the change of β and γ is 'very freq. in the cognate languages' (L. and S.), one does not see why *blau*, *bleu*, and 'blue' should not be akin to γλαυκός, and perhaps 'black,' blue being one of the dark colours.

If Homer found an epithet attached to Night, by the Egyptian priests, that meant both 'quick' and 'sharp,' and had it succinctly explained to him, he could not do better than translate it by *θοή*. Night is 'sharp' as Heracleides said, because the cone of darkness on the side of the earth that is turned away from the sun has a 'sharp' apex ; and Night is 'swift,' because this cone moves round, say, in 12 hours, *i.e.* at the rate of 1000 miles an hour. The Egyptians, τὸ πάντων λογιώτατον γένος, as Theophrastus called them, 'the most knowledgeable people in the world from time immemorial,' Porph. *de Abst.* II. 5, even if they did not make out that exact rate of motion, knew very well that the cone was 'sharp,' and that the speed was 'quick.'

If I am allowed, then, to assume that the *mystical* meaning of *θοή Νύξ*, being of Egyptian origin, was 'sharp' as the apex of a cone and 'swift' as Virgil's *sol rapidus*, *Georg.* II. 321, the question remains, 'what definite and intelligible idea (because, right or wrong, they were satisfied with nothing else) did the Greeks attach to Homer's *θοή Νύξ* in the same way as they certainly took γλαυκῶπις to mean 'blue' or 'sapphire-eyed' as early as the time of Ibycus? Hesychius, a collector of many Lexicons and Scholia, says *θοήν διὰ νύκτα θείαν, ταχέαν, ὀξείαν*, 'divine, quick, sharp,' exactly the old, old, Egyptian idea. But

they were probably content with the notion of 'quickly-passing' in that sense which Buttmann rejects, viz., that the time of night, passed in sleep, not being marked by innumerable events as the day is—being *intempesta* and *ἄωπλ*, 'not cut out into hours and moments with their separately occurring events or marks of time'—passes very quickly. So, as we would never say 'owl-headed Athenè' nor 'cow-headed Herè,' nor 'ass-headed Ares' nor 'ram-headed Zeus' nor 'dog-headed Hermes,' we content ourselves with saying 'quickly-passing Night,' just as the Greeks, confessedly, understood the word.

As a corollary of this, Homer called the Echinad Islands *θοαί* because they partook of a conical shape like the *Peak* of Teneriffe and the Lake-Country 'Pikes' or *apices*, Romance *Pic*.

The question whether Ulysses and Diomedes returned to the camp riding on the backs of the two horses of Rhesus, or driving them yoked to his chariot, is rendered difficult by the *ἐπεβήσατο δ' ἵππων*, vv. 513, 529, which elsewhere in Homer means 'mounted the chariot.' All the passages which relate to the question may be thus translated: vv. 471-481, 'they, the Thracians, were sleeping, surfeited with fatigue, and their beautiful armour lay by them on the ground, fairly arranged, in three rows; and near each of them was a pair of horses. Rhesus slept in the middle of the bivouac, and by his side the swift horses were tied with straps fastened to the extremity of the chariot-rail.' That would be one on each side of the hinder part of the chariot. 'Ulysses, seeing Rhesus in front of him, pointed him out to Diomedes: "there is your man, Diomedes, and there are the horses that Dolon, whom we slew, told us about. Come now, put forth strong energy: there is no need for you to stand doing nothing with your armour, but either untie the horses, or else slay the man; and then the horses shall be my affair."''

Diomedes, prompted by Athenè, chooses to kill Rhesus. Then, v. 500 *fol.*: ‘meanwhile sturdy Ulysses was loosing the solid-hoofed horses, and he tied them together with straps, and drove them out of the host of (sleeping) men, hitting them with his bow; for he did not think of taking the shining whip from the well-carved chariot: then he whistled by way of signal to the noble Diomedes. But he, abiding there, was debating what most shameless deed he should do; whether he, taking the chariot in which lay the well-chased armour, should pull it out by the pole, or lift it bodily up and carry it away.” Athenè then comes and tells him it is time to go: “and briskly (v. 512) he mounted the horses, *ἰππων ἐπεβήσατο*, and Ulysses beat them with his bow, and they flew to the ships of the Achaeans.’

When they reach the spot where they had left the spoils taken from Dolon (v. 528), ‘Tydeides jumped down, and put the gory armour into the hands of Ulysses, and mounted the horses, *ἐπεβήσατο δ’ ἰππων*, and he lashed them (*ἐμάστιξεν*, but he had no *μάστιξ*), and very willingly they flew. And Nestor was the first to hear the tramp, and said “the tramp of swift-footed horses smites me about my ears. Would that Ulysses and the doughty Diomedes might forthwith drive hither the solid-hoofed horses from the Trojans” Not yet was all his speech uttered, when they were there; and they got down upon the ground,’ etc. The horses are admired, and ‘tethered with well-cut straps to the manger in the stable of Diomedes,’ who again shows his ‘godlike ingenuity,’ *δῖον μῆδος*, in securing valuable property, as he did in the matter of changing armour with the blue-eyed Glaucus.

There is nothing said about any chariot after that v. 510, where Athenè plainly tells Diomedes that there was no time, and that he must be off, without trying either alternative, ‘pulling it out by the pole,’ or ‘picking it up

like a child's go-cart' and walking away with it. We cannot but infer that the writer of this Tenth Book makes Ulysses and Diomedes ride the horses, bare-backed, to the Greek camp. I shall leave untouched the question whether they rode with their legs 'astride,' περιβάδην, or κατὰ πλευράν, 'with both on the same side of the horse.' Europa rides the bull Zeus κατὰ πλευράν, Ach. Tat. I. 1. Venus Marina rides her hippocamp περιβάδην, in a very lovely fresco at Herculaneum.

In *Il.* XI. 85:—

τόφρα μάλ' ἀμφοτέρων βέλε' ἤπτετο, πίπτε δὲ λαός,

I wish to read ἔπτετο, because I cannot, and think no one else can, translate ἤπτετο. With ἔπτετο it will be, 'so long the spears of both were flying, and the fighting men were falling.' λαός ought never to be translated 'people' in Homer: it only means 'males of the military age'; see *Il.* VIII. 522: μὴ λόχος εἰσέλθῃσι πόλιν, λαῶν ἀπειόντων. *πρυλῆες* is an Aeolic compound of λαός and πρὸ or πρό, like ἀπὸ for ἀπὸ in Sappho (*Fr.* 44, and Alcaeus, *Fr.* 84, Bergk), and ἄγυρις for ἄγορά. λαός softens into λέως in Homer's proper name Πηνέλεως. Thus *πρυλῆες* will mean 'the first line of unnamed warriors fighting on foot behind the charioteers and πρόμαχοι.' πρόμαχοι means 'the chiefs and heroes mentioned by name who fought in front of all.' That meaning of *πρυλῆες* suits all the five passages in which it occurs—only in *Iliad*—and especially XII. 76, 77: 'let the esquires keep the horses and chariots on this side the fosse, and let us (Polydamas is addressing the Trojan πρόμαχοι) as a first line of men fighting on foot (*πρυλῆες*) go along with Hector.' This will be the πρόμαχοι dismounted and replacing the ordinary *πρυλῆες* as a front line.

The above quoted line, *Il.* 85, occurs four times (with no apparent difference of meaning), in which I would put ἔπτετο 'were flying,' without any demur. An undoubted ἦπτετο from ἄπτομαι occurs *Il.* xx. 468: ὁ μὲν ἦπτετο χεῖρεσι γούνων, 'he clasped his knees with his arms'; and there are other places where ἄπτομαι is thus properly used in the sense of 'clasping' and 'grasping,' 'taking hold of with fingers and thumb' or 'with extended arms.' These are the words to which it is applied: food; a ship; arms, *i. e.* spear and sword; cords of a ship; the meal-tub; another's head; another's dress; a corpse; one's country, falling on one's face with extended arms and kissing the ground. There are no other instances save one, and ἄπτομαι is properly used in all of these. It is not used properly in those four where βέλε' ἦπτετο was found, up to this. They are: *Il.* viii. 67; xi. 85; xv. 319; xvi. 778.

The one in which ἄπτομαι is as improperly used as in those four is *Il.* 17. 631:—

τῶν μὲν γὰρ πάντων βέλε' ἀπτεται, ὅστις ἀφείη . . .
 ἡμῖν δ' αὖτως πᾶσιν ἐτώσια πίπτει ἔραζε.

Here I would read βέλεα πτέται, a syncope which occurs elsewhere only in ἔπτατο (five times), πτάτο (twice), and πταμένη (thrice), in all of which it means 'flying,' twice of the arrow; all from πέτομαι.

I wish to declare that ἄπτομαι is always used in Homer in its proper meaning of 'grasping,' 'clasping,' 'fastening on with fingers, arms, jaws, or claws,' and that in those five passages, βέλε' ἔπτετο and βέλεα πτέται ought to be read.

As to *Il.* 17. 631, quoted just above, the meaning is: 'their javelins fly, and ours just drop vainly to the ground.'

It may be well to discuss briefly the other verbs which mean 'touch' in different ways, the meaning of ἄπτομαι

having been sufficiently indicated as 'fasten on to in a clasping way,' either only 'on two sides,' as with finger and thumb, or with jaws, or a pair of tongs or a vice; or else, 'on both sides all around,' as grasping a hand or a stick. The preposition ἀμφι is of the same root, and means accordingly either 'on both sides,' or 'all around close to'; whereas περι means 'around or about at any distance.' χράω, χράω and χραίνω mean 'graze with the tip of something in a horizontal direction,' as with the point of a spear, or a paint-brush, etc. ψαύω is 'graze one flat surface with another,' as with the flat of the hand. θιγγάνω is 'touch and merely touch,' as with the tip of an extended finger. Those are the senses in which the words are properly used in Homer and elsewhere; and *it is impossible to imagine a βέλκος ἀπτόμενον anything.*

In *Il.* XI. 100, στήθεσι παμφαίνοντας, ἐπεὶ περὶδυσσε χιτῶνας, if that word is a reduplication of φαίν-, as βαμβαίνω of βαίν-, then the παμ- is a very fair formation by assimilation and euphony. The meaning is said to be 'shining very brightly' with their breasts (L. and S.), where φαίνω is taken intransitively; and, against the analogy of βαμβαίνω, 'stagger,' the reduplication is taken as confirmative and not infirmative. There is no place, however, where φαίνω is intransitive in Hom., for φάνεσκε is for ἐφάνη. If an inferior Homerid chooses to say στήθεσι παμφαίνοντας he must expect it to be taken for πᾶν φαίνοντας, 'showing everything with their breasts after he (Agamemnon) had stripped them of their shirts.' For although χαλκοχίτων refers to a 'shirt of mail' of some kind, χιτῶν by itself can mean nothing but the linen shirt which seems to have been the only article of soft apparel which the heroes wore in battle. So, in effect, Winckelmann. But the line is too wretchedly bad to be anything other than an extract from some vulgar and obscene parody of the *Iliad*; and very unpleasant it is to see such a thing retained in our editions of Homer.

This Eleventh Book is the only one in which a Greek takes delight, like a savage, in deliberate and needless mutilation. Xenophon's men did it in their retreat, but only for dear life. Peneleos cuts off the head of Ilioneus by accident, *Il.* XIV. 496, and Agamemnon that of Coön in much the same way, below, v. 261. Here, v. 147, Hippolochus deliberately cuts off the head and arms of Peisander, who is mortally wounded. The true Homer allows Achilles to deal 'not tenderly,' ἀκηδέστωρ, with the dead Hector, but he protests against the treatment, saying ἀεὶκέτα μῆδερό ἐργα, 'he devised unseemly and ungenerous deeds,' *Il.* 22. 395; and he takes care that when all is over the corpse remains fresh as dew and beautiful to see.

The provocation to every form of revenge was tremendous in the case of Achilles. Melanthius also, *Od.* 22. 474, had exasperated the friends of Ulysses to the utmost, and his very complete mutilation reads like a righteous recompense; but Ulysses had to make long and tedious atonement for all that bloody work. So had Jason for his mutilation of Absyrtus, although 'thrice he licked some of his blood, and thrice spat out the pollution from his teeth, which is the orthodox form of expiation for the perpetrators of murder,' *Ap. Rh.* 4. 478. Any other instances of mutilation by Greeks are hard to find. The verb μασχαλίζω must not be taken literally in the *Choëphoroe*, and in the *Electra* of Sophocles, as some editors have taken it. Agamemnon's royal corpse was not mutilated; only, one of the usual forms of attempted evasion of retribution was gone through by the assassin, in wiping the blood off the blade of the sword on the victim's hair. ἐμασχαλίσθη in those two places only means 'he was murdered in due form'—the avowed murderer performed the rite held requisite for averting guilt, ἄγος.

Mutilation by beheading, and infliction of long torture

on body and mind by crucifixion, together with the still more refined and ingenious methods, were not Grecian inventions, but Persian and Roman. The ideal Greek is *καλὸς καὶ ἀγαθός*, 'good outside and in'; the Roman is *strenuus ac fortis*, 'vigorous and unflinching,' which is much the same as Homer's *σχεῖλιος*, 'ready to do and bear anything.' It seems as if the germs of human kindness brought by the Dorian, Achæan, and Athenian colonists were absorbed in the Italian system without producing any civilising effect on the native and indomitable ferocity of the Italian soul. That there have been a few Italians with hearts like Lucretius, Virgil, and Ovid is entirely owing to Greek culture. Take this away, and everything is savage and horribly revolting. I feel called upon to make these remarks because of a strange mistake which occurs in Dr. Andrews' edition of Freund's Latin Dictionary, and in that recently published by Messrs. Lewis and Short; it probably occurs in *all* the large Latin Dictionaries. Under the word *armarium* I find '*armarium muricibus præfixum*, the box set with sharp spikes, in which Regulus was put to death, *Gell.* 6. 4, *fin.*'

The passage, *Gell.* 6. 4, which has never been disputed, is as follows:—'*Tuditanus*^a *autem* (*Regulum*) *somno diu prohibitum atque ita vita privatum refert; idque ubi Romae cognitum est, nobilissimos Poenorum captivos liberis Reguli a senatu deditos, et ab his armario muricibus præfixo destitutos, eademque insomnia cruciatos interisse.*'

The passage in Gellius says: 'Tuditanus relates that

^a The "Tuditanus" is C. Sempronius, who was prætor at Rome in 132 B.C., and consul in 129. He is mentioned next to Cato as one of the most learned Roman historians, *Dion. Halic.* i. 11:—*οἱ δὲ λογίστατοι τῶν Ῥωμαίων συγγραφίων, ἐν οἷς ἔστι Πόρκιος τε Κάτων . . .*

καὶ Ἰδίος Σεμπρόνιος. His father C. Sempronius Tuditanus had, no doubt, been consul before he was sent as commissioner into Greece in 146 B.C., and was almost contemporary with M. Porcius Cato.

he, Regulus, was kept from taking sleep, and in this way deprived of life; and, when this became known at Rome, that the most noble of the Carthaginian prisoners of war were handed over by the Senate to the sons and daughters of Regulus, and were by them placed (standing up) in a clothes-press furnished with sharp protruding spikes, and left there, so that they perished tormented with the same want of sleep.' These 'most noble Carthaginians' were *two*, and their names are given elsewhere as Hamilcar and Bostar, who had both been in command of Carthaginian fleets and armies.

Since Cato and Polybius say nothing about this torturing of Regulus, Tuditanus (and those who give a similar account to his) must be taken as the best authority. He was a Roman and lived nearest to the time. A. Gellius, who reports his account, was also a Roman. Diodorus, 27, is extremely shocked at Regulus's arrogance in prosperity and judicial blindness in misfortune, and says that in every way he had forfeited all mercy—then proceeds to preach on that text in his solemn way. Livy's *Epit.* 18 says 'supplicio de eo sumpto, perit.' So Cicero in sober passages; but in *L. Pison.* 19 he avails himself of the popular error, the *vulgo narrata*, the *φασὶ . . . φασὶ, ὡς καὶ ὁ λόγος ἔχει* of Dion Cassius. Hor. *Od.* III. 5; Florus 2. 2; Sil. It. 6. 399, are rhetorical versions of the lie which was at last believed. There is also Val. Max. (reign of Tiberius) 1. 1. 14, and 9. 1, who inflicts a truly Roman torture on all who have to read his idiotic book, by his crass superstition and reckless mendacity.

I agree with Niebuhr. Regulus died a natural death in prison at Carthage; and the Romans attributed to their enemies the atrocities which they had themselves committed on better men than Regulus. At any rate, the Dictionary account of the word *armarium* must be corrected.

The word ἀνεμοτρεφῆς occurs only twice in Homer, *Il.* XI. 256, and XV. 625: here with ἔγχορ, and there with κῦμα. I should like to take the τρέφω as transitive in the first passage, and translate 'the gust-breeding spear' from the spear's producing a rush of air as it flies. It is in the same way that one gets an intelligible meaning for Virg. *Georg.* 4. 484: 'atque Ixionii vento rota constitit orbis,' 'and the wheel driving Ixion's orbit stood still along with the wind that it caused.' There is some astronomical allusion in the story of Ixion. His wheel works automatically, or in accordance with some physical law, which is the same thing. There is no actual authority for *cantu* in place of 'vento,' which latter is governed by the *cum* in 'constitit,' of which fact Servius seems to have been half conscious, since he says 'Deest cum,' but he makes the wind to be the cause of the rotation. Orpheus fascinated and bewitched the wheel set going by the Infernal Powers, just as he bewitched other things; and so the rush of wind ceased.

In the other place the τρέφω must be passive: 'the sweeping wave, bred by the gale under the clouds.' Each passage is wanting in the true Homer's clearness of conception and of expression.

With regard to XI. 354:—

Ἑκτωρ δ' ὧκ' ἀπέλεθρον ἀνέδραμε, μίκτο δ' ὀμίλῳ,

the word ἀπέλεθρον occurs *Il.* V. 245, ἴν' ἀπέλεθρον ἔχοντας, of Aeneas and Pandarus rushing on Diomedes, where 'force beyond measure' seems to be appropriate: and in *Il.* VII. 269 and *Od.* IX. 538, ἐπέρισε δὲ ἴν' ἀπέλεθρον, of which the same may be said. πέλεθρα occurs *Il.* XXI. 407, ἐπὶ δ' ἐπίσχε πέλεθρα πεισών, of the space covered by the prostrated Ares, and *Od.* XI. 577, where Earth's glorious son Tityus requires two hundred feet more than Ares to stretch his length and breadth upon. This is all well

enough, but I find it impossible to tolerate 'and Hector quickly ran back an immeasurable distance' before he fainted after receiving a knock on the helmet from a throw of the spear of Diomedes. There is no measure nor propriety in the language. If we read ὥκα πέλεθρον the line is good, and the great hero, *μυγείς δμῖλῳ*, is in a place of safety in which to swoon and recover. Thirty-three yards is surely enough in a hand-to-hand fight.

The comparison of Telamonian Ajax to an ass, in *Il.* XI. 558, is homely enough. We should not forget that the Egyptian War god had an ass's head, as the best type of one who, like Homer's ass, 'does not know when he is beaten.' I find a similar sort of homeliness in Shakespeare's 'Love's feeling is more soft and sensible Than are the tender horns of cockled snails': *Love's Labour's Lost*, IV. 3.

Il. XII. 153-163 is the passage from which Aeschylus drew the inspiration of *Sept.* 212, etc. In Homer's line, 153, I should much prefer *λάοισιν καθύπερθε πεποιθότες ἢ δὲ βίηφιν* rather than *λαοῖσιν*—so that it might be 'trusting to the stones piled upon the wall, and their own strength to wield them.' Homer elsewhere uses *λάεσσι* (nine times); and if there were no reason for preferring *λάοισιν*, I should propose *λάεσσιν* to take the place of *λαοῖσιν*. But this *λάοισιν* seems to be the origin of the *λάου* used by Sophocles, *O. C.* 196: *ἐπ' ἄκρου λάου βραχὺς ὁκλάσας*, which rests upon impregnable evidence not to be set aside by Dindorf. See C. E. Palmer's Ed. of *Soph. O. C.*

The big pebbles, boulders of four or five pounds weight each, *χερμάδια*, were brought from the beach as soon as an attack was imminent.

I am not disposed to pass over *Il.* XII. 213—

... ἐπεὶ οὐδὲ μὲν οὐδὲ ἔοικεν
δῆμον ἔοντα παρὲξ ἀγορεύμεν, οὐδ' ἐνὶ βουλῇ,
οὔτε ποτ' ἐν πολέμῳ,

where ἐν δήμῳ, ἐν βουλῇ, ἐν πολέμῳ are co-ordinate, and it is as clear as can be that we ought to read either δήμῳ ἐν ὄντα or δήμῳ ἐνόντα. Since the ι of the dative is elided in Epic poetry (and sometimes elsewhere), if there can be no mistake about the case, and ἐνι is put after its noun *thirteen* times in Homer, we might even propose a third correction δήμῳ ἐν' ὄντα. At all events, δῆμον ἐόντα is to be extinguished henceforth and for ever. The meaning is plainly: 'it is not fit that, whether you are in an assembly of the people, or of the elders, or in a council of war, you should speak away from the question proposed, or, in any irrelevant way.'

In *Il.* XII. 225, οὐ κόσμῳ παρὰ ναῦφιν ἐλευσόμεθ' αὐτὰ κέλευθα, which is simply untranslatable, I would read αὐτοκέλευθοι, 'each one taking his own road, as in a widely-scattered rout.' For it is from this line that Tryphiodorus, *Hal. Il.* 314, took his Ἄτη ἐς πόλιν αὐτοκέλευθος ἐκώμασε— 'then Atè started for the city in her own wild way, by a path of her own choosing.'

(To be continued.)

NOTES AND EMENDATIONS ON PLAUTUS.

Amphitruo, 241 (ed. Ussing) (1. 1. 92).

Cum clamore involant, impetu alacri :
Foedant et proterunt hostium copias
Jure injustas.

We should read *impetu cum alacri* in the first line, to complete the fourth cretic. *cū* easily fell out after *-tu*. The shortening of *cum* with hiatus is common in Plautus. For the order, compare *flagitio cum majore*, Epid. 3. 4. 79. Hermann adds *ruunt* to the MS. reading given above without sufficient ground.

Amphitruo, 379 (1. 1. 231).

MERC. Amphitruonis te esse aiebas Sosiam. Sos. Peccaveram ;
Nam Amphitruonis socium† ne me esse volui dicere.

Perhaps :

Nam Amphitruonis socium *re* med esse volui dicere,

‘What I *really* meant to say was, that I was Amphitryon’s comrade.’ This parechesis is the solitary weapon of offence in the armoury of those who defend the old soft pronunciation of *c* before *i* and *e*, against the lovers of change. Mr. Wordsworth, in his *Fragments and Specimens of Early Latin*, accounts for it as an Umbrism. May not the soft sound have been a vulgarism? thence imported into the Romance languages? *re* ‘in reality’ has fallen out or been corrupted more than once in Plautus: cf. *Miles* 606, where, as Prof. Tyrrell has pointed out, it may have dropped out after *facere*.¹ Similarly, *re* may have fallen

[¹ The discovery, in A, of *illi* after *facere* has thrown some doubt on this, however.]

out after *audire*, Merc. 874 (5. 2. 45), *Maxime quod vis audire re audies*. There B omits *re*, and C fills up the gap with *it* (*id.*)

Amphitruo, 529 (1. 3. 35).

JUPP. Cur me tenes?

Tempus†: exire ex urbe prius quam luceat volo.

Ussing, and Goetz and Loewe agree in supplying *est* with the inferior MSS. I should prefer

Tempus IT: exire ex urbe prius quam luceat volo.

‘The time is getting on’: cf. Ovid, *Am.* 1. 6. 24:

Tempora noctis *eunt*: excute poste seram.

Pseud. 242 (1. 3. 12), *it* dies. *it* (= eit) occurs several times in Plautus.

Asinaria, 648 (3. 3. 65).

Custos erilis, decus populi, thesaurus copiarum,
Salus interior† hominis amorisque imperator.

I propose: *Salus interior*, is minis, *amorisque imperator*: ‘by means of those minae.’ For *is minis*, cf. *Epid.* 5. 2. 40.

Bacchides, 396 (3. 2. 15).

Nunc, Mnesiloche, specimen specitur, nunc certamen cernitur,
Sine necne, ut esse oportet, malus bonus, quousvismodi,
Justus injustus, malignus largus, †comincomodus.

Plautus attempts to form a compound adjective, *commincomodus*, ‘good-ill-natured.’ There probably was in the original Greek a legitimately-formed compound adjective, combining the two opposing features.

Bacchides 1127 [5. 2. 11].

A. Vetulae sunt †thimiamae. B. At bonas fuisse credo.

So B; C gives *thim, amae*. I cannot think Coler's conjecture, *minae ambae*, right, though received by most critics, except Ussing, who gives *nimis ambae*. I dare to propose:

A. Vetulæ sunt *humæne*. B. At bonas fuisse crédo.

'Tolerably (*i.e.* very) old.' *humane* with *t* preceding might easily be corrupted into *thimiame*. This would furnish a much-wanted parallel to Horace's *humane comoda*, Ep. 2. 2. 70. *Humane* = ἐπεικῶς, 'admodum,' may have been a mere colloquialism. It is to be remembered that Plautus supplies the only parallel to Horace's use of *noster* for 'myself.'

Casina, 136, Geppert (2. 3. 22).

Cleostrata addresses her perfumed roving husband thus, according to the MSS.:—

†Nihili cana culex vix teneor quin quæ decent te dicam.

We might read—

Nihili cucule! vix teneor quin quæ decent te dicam!

As Ussing remarks, on *Asinaria* 914, the term *cuculus* was applied to those *qui vagos amores sectantur*. Some might like to bring in *cane*, on account of that line in the *Asinaria*, *Cano capite te cuculum voxor ex lustris rapit*, but the line will not hold it. The loss of the first *cu* in *cucule* was the *fons et origo* of the whole corruption and subsequent interpolation. Such an anapæst as *teneor* does not seem to have been absolutely prohibited in the fourth foot: cf. *As.* 575, where *continui*, according to the MSS., ends the first member of the septenarius.

BOVES LUCAE.

In the *Casina* the ill-used wife Cleostrata, seeing through the design of her husband in marrying her maid Casina to his country steward Olympio, pretends to give

her consent to the marriage, but in reality dresses up Olympio's rival Chalinus as the bride. The pretended bride, hidden under a veil, behaves with great roughness—so roughly as to cause Stalino to exclaim (704, Geppert): 'She has trod on my foot like an elephant'; *plantam institit quasi Luca bos!* All MSS., save A, give *quasi iocabo*; hence the nonsensical vulgate *quasi jocabor*.

This beautiful reading would certainly have been discovered by conjecture, though perhaps not for some years. Of what a prize has Cardinal Mai's discovery robbed the emendator! As Geppert's edition is not in the hands of everybody, I may be pardoned for mentioning this reading here.

Curculio, 212 (i. 3. 56).

PHAED. Quando ego te videbo? PLAN. Em istoc verbo vindictam para:

Si amas eme: ne rogites.

Ussing obelizes *istoc verbo*, unnecessarily, perhaps. I explain the words *istoc verbo vindictam para* thus: 'give that expression its freedom,' *i. e.* never say again 'when shall I see you.' *Istoc* may be an old dative, and Planesium tells Phaedromus he may dismiss such a question for ever, at the same time that he buys and manumits her. *Verbum* generally in Plautus means, not 'a word,' but 'a sentence,' 'saying.' It is used thus in an equally forcible construction in the following passage:—

Stichus, 183-195 (i. 3. 30-41).

Oratio una interiit hominum pessime,
Atque optuma hercle meo animo et scitissima,
Qua ante utebantur: 'veni illo ad cenam: sic face:
Promitte vero: ne gravare; est commodum?
Volo inquam fieri: non amittam quin eas':
Nunc reppererunt jam ei *verbo* vicarium
Nihili quidem hercle *verbum* id ac vilissimum:

‘Vocem te ad cenam, nisi egomet cenem foris,’
Ei hercle verbo lumbos diffractos velim,
 †Ni vere perierit si cenassit domi.
 Haec *verba* subigunt me uti mores barbaros
 Discam, atque ut faciam praeconis compendium
 Itaque auctionem faciam, ipse ut venditem.

If a person can say he would like the back of a saying to be broken, a person can surely say ‘give freedom to a saying.’ The obelized verse of the passage from the *Stichus* is corrupt. The best MSS. (perhaps including A) give it as above. The clue to a seemingly probable emendation is to be gathered from observing that a second saying is embodied in the corrupt line. This is shown by *verba* following, in the plural, the singular having been used before. *Two* excuses seem to be made. This conclusion seems enforced also by the parallel passage in the *Rudens*, *ad fin.* :—

Sequimini intra : spectatores, vos quoque ad cenam vocem,
Ni daturus nihil sim, neque sit quidquam pollucti domi,
Nive adeo vocatos credam vos esse ad cenam foras.

The first excuse is there and here introduced by *Ni*; a second by *Nive*. This second excuse was one which the stingy man would have used in case he dined at home—

‘Nive *IRE* perierit,’—si cenassit domi.

‘I would ask you to dinner,’ says the inhospitable man, ‘if I were not engaged out myself, or if’ (supposing he dines at home) ‘it would not be not worth your while coming.’ So *eas*, *supra*. Hence the parasite goes on to complain of *haec verba*, not *hoc verbum*.

Epidicus, 349 [3. 2. 13].

Strat. Nam quid ita? *Epid.* Quia tuum patrem faciam
 †parenticidam.
Strat. Quid istuc est verbi? *Epid.* Nihil moror vetera et
 volgata verba.

We must, in the first place, correct *faciam* to *feci jam*, because Epidicus is glorying in the swindle he has already committed on the father of Stratippocles. Then for *parenticidam* we may read *panticidam* = *panticicidam*, from *pantices*, 'the bowels,' to which Epidicus likens the purse of the old man. There are several references of this sort in the play. Cf. 508: Meum exenteravit Epidicus marsupium. 186: Acutum cultrum habeo senis qui exenterem marsuppium.

Curculio, 317 [2. 3. 38].

Perii, prospicio parum:

Os amarum habeo dentes plenos lippiunt fauces fame.

As it is likely some may be carried away by Büchelers' specious conjecture *gramarum*, I wish to point out that *os amarum* is established beyond a doubt by Celsus, i. 3: *si etiam os amarum est, vel oculi caligant, aut venter perturbatur*, and *ibid. aut sonant aures aut madent oculi, aut os amarum est*: probably similar passages occur. Ussing has in all probability restored the hand of Plautus by writing *os amarum habeo dentes flent*, or perhaps *flent dentes*.

The dative *mi* has fallen out in the following passages after *m* and before *i*:—

Amphitruo, 917.

Da mihi hanc veniam, *mi* ignosce irata ne sies.

Mercator, 818.

Limen superum *mi* inferumque salve, simul autem vale.

Stichus, 195.

Itaque auctionem faciam *mi* ipse ut venditem (p. 57, *supra*).

Mostellaria, 18 [1. 1. 18].

Cis hercle paucas tempestates, Tranio,
Augebis ruri numerum genus ferratile.

Possibly we should here read *innumerum*, 'you will

add one to the countless Chain-band race.' *i* fell out after *i*; *n* before *n*. Cf. *Mart.* 9. 23. 4: Et sonet innumera compede Tuscus ager.

Most. 187 [1 3. 35].

Di deaeque omnes me pessumis exemplis interficiant
Nisi ego illam anum interfecero siti fameque atque algu.

I quote these lines for the purpose of showing the confirmation they afford of Mr. Margoliouth's felicitous emendation of *Agam.* 1621, where he writes δειμὸς δὲ καὶ τὸ ῥίγος αἱ τε νήστιδες δύναι διδάσκειν ἐξοχώταται: (ῥίγος for γῆρας). *Fames* is often joined with *algu*, thus.'

Most. 215 [1. 3. 63].

Eundem animum oportet nunc mihi esse, gratum ut inpetravi.

'Oratio dura minimeque Plautina,' Ussing. For *gratum* read *oratum*, 'my petition' = *optatum*. Cf. *Ter. Hec.* 3. 3. 25: cum orata ejus reminiscor. *Ibid.* 4. 1. 60: orata nostra.

Most. 458 [2. 2. 37].

T. Aedis ne adtigatis. Tangite
Vos †quoque terram. ΤΗ. Obsecro hercle quin †eloquere.
T. Quia septem menses sunt, quom in hasce aedis pedem
Nemo intro tetulit, semel ut emigravimus.

We may here read—

Tangite

Vos quisque terram. ΤΗ. Obsecro hercle, quor ita?

eloquere arose from a fusion of *-cle* and *quor*. Compare *Bacch.* 251: Quid ita, obsecro hercle.

Most. 616 [3. 1. 94].

TRAN. Huic enim debet Philolaches Paulum. THEO. Quantillum? TRAN. Quasi quadraginta minas. Ne sane id multum censeas. DANISTA. Paulum id quidem est. THEO. Adeo etiam argenti faenus ꝑcredit audio. TRAN. Dic te daturum, ut abeat.

Paulum id quidem est probably belongs to Theopropides, *ironice*, as Ussing suggests. The third line, however, certainly is a reminder on the part of the Danista respecting the interest owing, except *audio*, which again belongs to Theopropides. We should read the passage thus:—

THEO. Paulum id quidem est.

DAN. Adeo etiam argenti faenus *cedit*. THEO. Audio.

TRAN. Dic te daturum, ut abeat.

Adeo cedit = *eo accedit*, 'falls to be added thereto.' There is some scepticism and sarcasm expressed by this simple *audio*: its usage thus is too frequent to need illustration.

Most. 836 [3. 2. 165].

Theopropides is afraid of the dog in the hall. Tranio tries to reassure him by telling him it is as quiet as—what?

Tam placidast quam . . a qua . uis . ire intro audacter licet.

So B, at first hand, which, I think, represents the true reading here more nearly than C, which has *quam feta*. Now *placida* was a common epithet for sheep: Ov. *Met.* 13. 927, and Terence, *Adelph.* 4. 1. 18, has *cum fervit maxime tam placidum quam ovem reddo*. I therefore suggest that the line may have run, either:

Tam placidast quamst *agna* quaevis: eire intro audacter licet;

a conjecture made independently by Dr. Ingram : or

Tam placidast quamst quævis ovis. *Vise* : ire intro audacter licet.

And *ovis* must be restored in another passage :

Persa, 173 [2. 1. 6].

Nam equidem te jam sector quintum hunc annum : interea jam credo,
†Quis si in ludum iret, potuisset fieri ut probe litteras sciret.

We must read OVIS for QVIS : 'If a sheep had been at school as long it would be a scholar.' For the stupidity of the sheep, see Propert. 2. 16. 8 : *Et stolidum pleno vellere carpe pecus*. The vulgate gives *cucus*, 'a daw.'

Ibo has fallen out after *reddibo* in *Men.* 1019 [5. 7. 13] :

Salvom tibi ut mihi dedisti reddibo. *Ibo* : hic me mane.

Poenulus, 268 (1. 2. 61).

Monstrum mulieris ! tantilla tanta verba funditat,
Quoius ego nebulae cyatho septem noctes non emam.

Ussing has for the first time rightly explained the second line : *quoius nebulae* go together ; the girl is compared to a mist—a slight creature. So 345 *infra*, she is said to be *nimbata et nugae merae*. The only alteration then necessary is to read *nebulai* or *cyatho uno* with Ussing. Seeing that the ordinary translation, 'a glass of fog,' could not be intended, I proposed *Neobulae* lately, taking her for a *cupa* who gave short measure at her bar, comparing Ar. *Plut.* 436, which conjecture I now revoke.

Poenulus, 810 (3. 6. 16).

Verum ita sunt . . . isti nostri divites :
Si quid benefacias, levior pluma est gratia ;
Si quid peccatum est, plumbeas iras gerunt.

Omnes is inserted by the edd. before *isti*. I do not see how *omnes* could have fallen out here; but I do see how either *MORATI* or *animati*, one of which words is the true reading, could have fallen out, namely, from the copyist's eye catching the *ti* of *isti*. Cf. *Truc.* 1. 2. 5. (103):—

Ita nunc sunt adulescentes *morati*: quippe
 Ut semel adveniunt ad scorta congerrones,
 Consulta sunt consilia, quando intro advenerunt ad nos.

And *Asinaria* 2. 3. 10 (387):—

Ita haec *morata* januaſt: extemplo janitorem
 Clamat procul ſi quem videt ire ad ſe calcitronem.

There are not ſuch good parallels for *animati*.

Pseudolus, 349 [1. 3. 114].

CAL. Eho, Pseudole,

I, gladium adfer. PSEUD. Quid opus gladio?

CAL. Qui hunc occidam atque me.

PSEUD. Quin tu te occidis potius? nam hunc jam fames occiderit.

It has been pointed out that Calidorus cannot have ſpoken of killing himſelf, as otherwiſe Pseudolus would not have ſaid, ‘quin tu *te* occidis potius?’ And B comes to our aſſiſtance; for inſtead of *occidam* it has *occidar*, one of thoſe finger-poſts which an honeſt MS. often erects on the road between the original reading and total corruption: whence we may readily conjecture that ULCISCAR is the true reading, eſpecially as *hunc* precedes. Cf. *Men.* 460 [3. 2. 7], where *ultus* is uſed with a zeugma, not quite the ſame as this, but ſtill ſo like it as to prove the truth of this conjecture:

Non hercle iſ ſum, qui ſum, *ni hanc injuriam*
Meque ultus pulchre fuero.

The passage just corrected may give some light towards restoring a very corrupt place in

Menaechmi, 422 [2. 3. 78].

MEN. Eho, Messenio, huc accede. MRS. Quid negoti est ?

MEN. †Sussciri.

MESS. Quid eo opust ? MEN. Opus est †scio ut me dicas.

MESS. Tanto nequior.

Menaechmus, elated at receiving a strange lady's invitation, here, I think, tells his slave in exaggerated language that he feels himself a god, a Jupiter, and bids him bring incense to sacrifice to him.

MEN. *Tus fer, i !*

MESS. Quid eo opust ? MEN. Opust *Jovem* ut me dicas.

The cases of *Juppiter* are peculiarly liable to corruption: *iouē* is a strange word (see *Hermathena*, vol. iv. p. 449): here it borrows *sc* from *st* preceding, and loses *uē* before *ut*. It is quite plain that in the corruption *sussciri* there are three things—(1) the imperative 'go'; (2) the imperative 'bring'; (3) the thing to be brought.

The passage from the *Pseudolus* shows that a particular thing is sent for, and that such an emendation as Ussing's *subsili*, 'jump for joy,' is wrong.

Pseudolus, 714 (2. 4. 20).

CALID. Utrumque salve. Sed quid actum est ? PSEUD. Quid times ?

CALID. Attuli hunc.

It is quite clear that *attuli hunc* is no answer to the question of the MSS., *quid times* ? but to a question 'who is that with you ?' We must read either *quist comes* ? or *qui tu homo es* ? addressed to the third party, Charinus.

OBNOXIUS.

This adjective occurs in two passages of Plautus where it is decidedly difficult to explain. By placing them together we may arrive at the right meaning. *Epidicus* (5. 2. 29: 693) is being handcuffed—

PER. Cedo manus igitur. EPID. Morantur nihil. Atque arte conliga.

Nihil volunt *obnoxiae* esse. PER. Facto opere arbitramino.

The other passage is *Stichus* 497 (3. 2. 41), where the parasite exclaims—

Perii hercle vero plane, nihil *obnoxie*.

The meaning of the word is nearly the same in both these passages. *Obnoxius* may well be 'liable to fault-finding,' 'open to censure.' *Epidicus* says he wants his hands bound in such a way that there will be no doubt about his being secure—in a way with which no fault can be found. *Gelasimus* says he is undone so completely, so thoroughly, that no fault can be found with the thoroughness of his undoing. Translate in both cases—'*past all question.*' *Gellius* (7. 17) describes a discussion he had with a foolish grammaticus respecting the meaning of *obnoxius*, and cites the passage from the *Stichus*, but throws no light on its meaning.

PLAUTUS AND PROPERTIUS.

The connexion between these two Umbrian poets is very noticeable. Many passages in Propertius seem directly imitated from Plautus, and some of the grammatical peculiarities of the former may be accounted for by his Umbrian origin.

To make out a list of these *non hujus est otii*; but I will make use of the points of resemblance in these two poets to say a word here about a vexed passage in Propertius, 3. 7. 43, *segg.* :

Quod si contentus patrios bove verteret agros,
Verbaque duxisset pondus habere mea,
Viveret ante suos dulcis conviva Penates,
Pauper: at in terra nil ubi flere potest?

The fourth line, the disputed one, should thus be punctuated, and the MSS. need not be changed at all: 'With small means I grant; but where on this earth is it possible to have no cause for complaint?' Nearly so I wrote in *Hermathena*, vol. iv., p. 61, but I then gave the more usual *terris* and *potes*. But Plautus uses *terra* (as *Bacch.* 1169: *senex optume quantumst in terra*); and he often uses *potest* impersonally. But the passage which convinces me of the correctness of the MS. reading is *Truc.* 415 (2. 4. 64):

Ubi sine labore res geri pulcre potest ?

On vs. 2. 3. 13 of the *Truculentus* I wish to make a slight improvement in an emendation I proposed, *Hermathena*, iv., p. 254—the line *Quae tibi mille passuum peperit moram* should be altered, not to *Vae tibi mi mille passum peperisti moram*, but to

Vae tibi ! *mi* mille passum pepererit moram :
pepererit = *pariet* in Plautine syntax, 'it will produce'

DIRECTUS.

This word, the meaning, derivation, and even scansion of which is disputed, may well be called the *crux philologorum*, as Ussing terms it. It occurs thirteen times in Plautus, and it is cited from Varro once by Nonius. The following are the passages where it is found in Plautus,

the MSS. reading being given in every case as far as is material:—

Bacch. 4. 1. 8 [Iamb. Trim.].

Recede hinc dierecte. Ut pulsat propudium.

(2). *Cas.* 1. 1. 5 [Iamb. Trim.].

Abi rus abi dierectus tuam in provinciam.

(3). *Capt.* 3. 4. 103 [Troch. Sept.].

Quin quiescis? i dierectum cor meum ac suspende te.

(4). *Curc.* 2. 1. 26 [Iamb. Trim.].

Lien dierectust. Ambula: id lieni optimum et.

(5). *Merc.* 1. 2. 72 [Troch. Sept.].

In *hinc* (hoc B) dierectus, nugare in re capitali mea.

(6). *Men.* 2. 3. 87 [Troch. Sept.].

Ducit lembum dierectum navis praedatoria.

(7). *Merc.* 4. 4. 16 [Iamb. Trim.].

Abin dierectus. Haud malast. At tu malus.

(8). *Most.* 1. 1. 8 [Iamb. Trim.].

Abi rus; abi dierecte; abscede ab janua.

(9). *Most.* 3. 2. 163 [Troch. Sept.].

St, abi canis. St, abi dierecta. St, abin hinc in malam crucem.

(10). *Poen.* 1. 1. 32 [Iamb. Trim.].

Abi dierectus. Dic mihi vero serio.

(11). *Poen.* 1. 2. 134 [Troch. Sept.].

Bellule hercle. I dierecte in maximam malam crucem.

(12). *Rud.* 4. 14. 126 [Troch. Sept.].

Sucula. Quin tu i dierecta cum sucula cum porculis.

(13). *Trin.* 2. 4. 56 [Iamb. Trim.].

A. Abin hinc dierecte. B. Si hercle ire occipiam votes.

To these, to make the list complete, must be added the passage cited by Nonius from Varro—Nonius, p. 49:—*Dierecti dicti crucifixi, quasi ad diem erecti. Varro, Eumenidibus :*

(14). [Iamb. Sept.].

Apage in diirectum a domo nostra istam insanitatem.

On passage 13 Brix says that *dierectus* is always three syllables : one of the most extraordinary statements ever made. The word is usually marked *dīērectus* in our modern dictionaries ; but it is, I think, quite certain that the only true measure of the word was *dīērēctūs*, as the editor of Forcellini corrects him. This is the *only* scansion, which will suit passage (1), (where *prōpūdium* is the true scansion, not *prōpūdium*) ; passage (5) ; passage (6) ; and which suits all the passages very much better than the other scansion, with the sole exception of (13) ; but in this passage *hinc* can easily be left out, or, what is more likely, *abin* should be *abi*, in which case *ab' hinc di* is a regular Plautine anapæst. To sum up:—

- (1). *Dierectus* only possible scansion.
- (2). Both *dīērectus* and *dierectus* possible. In either case 'tuam' is monosyllable.
- (3). Both possible. With *dīērectus* 'meum' is monosyllable.
- (4). Both possible. But with *dīērectus* 'lieni' only has synizesis : with *dierectus* both *lien* and *lieni* have synizesis, as the word *always* has in Plautus :—

Curc. 2. 1. 5.

Nam jam quasi zona liene cinctus ambulo.

Curc. 2. 1. 21.

Sed quid tibist ? lien enecat, renes dolent.

Cas. 2. 6. 62.

Perii ! cor lienosum opinor, habeo : jamdudum salit.

- (5). *Dierectus* only possible. (*In* = *Isne*, 'be off.')
- (6). *Dierectus* only possible.

- (7). Both possible.
- (8). Both possible.
- (9). Both possible.
- (10). Both possible.
- (11). *Diērectus* only possible, without supposing a violent hiatus.
- (12). *Diērectus* only possible, without violent hiatus.
- (13). *Diērectus* only possible if reading is sound.
- (14). *Diērectus* impossible without violent hiatus.

The case for *diērectus* is even stronger than I have stated it; for *abi* is very much oftener a pyrrhic than it is an iambus in Plautus, save, of course, at the end of a line. This would give to *diērectus* passages (2), (7), (8), (9), (10). I do not think any reader of the above passages will hold that *diērectus* was ever the metrical value of the word; much less will assent to Brix's remark, 'dass das Wort durch Synizese stets dreisilbig ist.'

So far I have only attempted to prove that *diērectus* is always of four syllables, and that the first syllable is long. This is, I think, proved. A short second syllable would suit all the passages as well as a long one, save (3) and (14). These, if the reading be sound, as it apparently is, prove that the second syllable is long also.

As to the etymology and meaning of the word, I have nothing to add to what has been said by others.

A. PALMER.

February 7, 1884.

POSTSCRIPT.

In the above Article I have several times said *diērectus* was the only possible scansion, where *diērectus* would be *possible*; but I did not conceive that anyone held this view. I was arguing against a trisyllabic theory. But I see that Hermann, in his preface to the *Bacchides*, says that *diērectus* begins with an anapæst. This view is refuted by passages (1), (6), (7), (14), quoted above; and although the other passages are not absolutely incompatible with it, anyone whose ear is practised in Plautine scansion will feel that the theory of a long first syllable is infinitely preferable even in those passages.—A. P.

PROFESSOR SAYCE ON THE IONIC OF HOMER AND HERODOTUS.

BOOKS like Professor Sayce's *Herodotus* must give us pause. The sincere lover of truth will welcome with open arms discoveries of any and every kind. Whatever is true is truth, and truth must fit in somewhere in the grand whole. Our stock in hand may be modified by the new article, but it cannot be nullified, unless always it is hypothesis, *i. e.* not truth at all. But, in general, the discoverer or expounder, as the case may be, not only puts on his very new wine in very new bottles, but exhorts us to get rid of our old, telling us that the mellow vintage dating from Consul Manlius is very poor trash indeed. As Cromwell said, Let it out. And the latest idea is, that everything Greek is very much overrated, except, perhaps, art.

The note struck by Mr. Sayce and Mr. Mahaffy,

οἱ δ' ἄρ' ἔσαν διδύμοι,

has passed into the press. A writer in the *Graphic* exults over the vulgarity introduced in the recent representation of the *Birds*, because it illustrates the want of gentlemanliness amongst the Greeks ;

' O loss of one in heaven to judge of wise.'

Surely Plato's dialogues are courteous in spirit, and contrast favourably with the tone of English controversy, whether Cavalier, or Tory under the Regency. I do not

believe that either Plato or Aristotle would, under any circumstances, have used the language in which Christopher North speaks of Macaulay. And certain members of every University—English, Scotch and Irish—Wales has not had time to furnish its quota of ἀγποικία—would be much improved by the practice of Aristotle's hints on manners given in the Nicomachean Ethics.

But the question is not one of manners. The question is, Whence comes the mental furniture of every educated European and American? From Greece, and the Old and New Testaments. That is to say, our ideas are partly Hellenic, partly Shemitic. If anyone will turn to Josephus, *Wars*, II. viii., he will see that, at the coming of Christ, the Pharisee and Sadducee exactly corresponded to the Stoic and the Epicurean. Many of the ethical elements of the gospels are taken from tradition, and whence came the ethical in Jewish tradition? Not certainly from the Law, though there is some of it in the Prophets, but in them it is Jewish first, and ethical afterwards. The ethical element—morality between man and man—came mainly from Alexandria, where Jew and Greek met—the bond of union being the Genesis of the Attic Moses—the *Timæus* of Plato. On the other hand, the theistic and theocratic element in us is mainly Shemitic. But the rest is Greek—poetry, drama, history, oratory, art. And to take the last first, the balance of faculties is Greek. No Greek was a mere æsthete. The nearest approach to our modern androgyne was the Sybarite—the inhabitant of a remote colonial town. I do not believe that any Greek would ever have preferred a masterpiece of Phidias to a book of the *Iliad*. What of our drama? More's *Utopia* and Shakespeare himself show that Seneca and Plautus were the types of Tragedy and Comedy. This is hardly worth mention, were not the miracle plays held up as the origin of our drama. Had the Persians won Marathon, Greece

would, as a Persian satrapy, never have risen to the pre-Persian position of Ionia. Ionia was fertile in poetry, history, and philosophy, but the satrap and his tax-collectors changed all that. There is nothing to show that the Celt or the German would ever by themselves have advanced beyond the condition described by Cæsar and Tacitus. In a word, without Greece, Europe would not have been even a China; and its history, as far as Celts and Germans are concerned, might have been summed up in three words—a talk, a drink, and a fight. These, in place of being the relaxations, would have been the Whole Duty of Man.

Now archaeology and philology show that Greece is not a phoenix; it is not surrounded by a Chinese wall: in the chain of antecedence and consequence, it is connected with what goes before and after. This may be, and is, quite true, but it does not touch the point on which the classical scholar insists that the Greeks are so different in degree, that they differ in kind from their surroundings.

Philology has shown us in part the meaning of the Greek inflexions: it has also in most cases shown the meaning of the root; but it has also shown us our ignorance. It has shown us that we have not materials for the elucidation of all the words in Homer. That is to say, a comparison of all the passages in which a particular word occurs will not in all cases give us its true sense. At the same time, we are not at all worse off in this respect than Æschylus, Thucydides, or Plato; and in many respects we have more accurate knowledge of Homer than they possibly could have had. In historic times, Homer always was what Homer will always be—the most vivid of writers, the general sense clear; but embedded in the clear medium we find mysterious products, the meaning of which we can partly guess, but cannot know.

We hear a great deal of the infallibility of inscriptions. Mr. Sayce considers that they would certainly be composed in as careful a style as the work of a literary man, *Herod. Introduc.* xxxviii. Why so? The Greek magistrates were mostly annual: the inscriptions were short, and granting, for argument sake, that the egotism of a Greek official was even as great as that of a Lord-mayor, he could hardly have as much experience in composing inscriptions as Herodotus had in his nine books. Mr. Sayce refers in support of his case to the language of Acts of Parliament and of the Courts. *Non venisse volet.* If there is anything to mar the unclouded serene of the legal mind, it is the language of an Act of Parliament, and the dicta of eminent judges. In fact, the very thing that Mr. Sayce says could not occur in a public document, the plural for the singular, is found in an Act of Parliament; 'The Universities of London.' And the next time he is in Dublin I should suggest a look at the inscription¹ on the statue of George II. in Stephen's-green.

Again, there is nothing to show that the literary language was the same as that of the inscriptions. Tennyson's *Maud* requires more words than her settlements would in Lincoln's Inn. And we know that the Athenian

1

GEORGIO SECUNDO
MAGNA BRITANIA FRANCIE
ET HIBERNIA
REGI
FORTI ET REIPUBLICA
MAXIME FIDELI
PATRIIS VIRTUTIBUS
PATRONI SECUIO
S. P. Q. D.
A. D. 1758.
THOMAS MEAD . PRATORE URBANO
MICHAEL SWENY . VICE-COMITIBUS
WILLIAM FORBES.

inscriptions used one alphabet, while Euripides used another. The well-known passage from the *Theseus* proves that the poet had our signs for *eta* and *epsilon*, while *epsilon* in the inscriptions stood for both.

As to the matter of Eastern inscriptions one word must be said. The Great King may have been, as the Gipsy said of Walter Scott, 'a good man,' but he certainly was 'an aufu' leear.' If a member of the Alpine Club related how he went up the Matterhorn on a bicycle, the statement would be remarkable. Shalmaneser is more privileged: 'Trackless paths and difficult mountains, which, like the point of an iron sword, stood pointed to the sky, on wheels of iron and brass I penetrated,' quoted in Cheyne's *Isaiah*, i. 209. Sennacherib, too, talks in Ercles' vein: *Isaiah*, xxxvii. 24, 25. So that it seems rather hard to denounce Herodotus for want of veracity on the strength of an Oriental inscription.

In one respect, the position of the archaeologist is natural. He wishes for facts, and people are getting weary of the resplitting of chopped straw by the classicist. Messrs. Verrall and Margoliouth are threatening to rewrite all the Greek authors. I regret to say there is too much truth in Dr. Congreve's remarks on the effects of the pure classical system: Aristotle's *Politics*, p. 524. He who reads the great ancients for themselves wishes to feel the influence of the antique, like the traveller face to face with the solitary presence of the Apollo. But this is not allowed him. Momus criticizes the slipper of Aphrodite, and the jabber of Thersites jars upon sorrowful admiration for the Amazon lying dead and beautiful amid the carnage (*Q. Smyrn.* I. 718, *sqq.*)

To show that Homer is not such a very fine thing after all is the task of the iconoclast. Mr. Sayce tells us that 'the most certain and important evidence to which we can appeal is the language of the poems': Mahaffy's *Greek*

Literature, i. p. 403. 'A close examination of the language of Homer shows that it is a mosaic, in which words belonging to different ages and three different dialects—Æolic, Ionic, and Attic—are mixed together in such a way as to prove it to be an artificial dialect, never really spoken by the people, but slowly elaborated by successive generations of poets for the needs of Epic compositions. In its present form it cannot be earlier than the seventh century before the Christian era—the age, in fact, to which Euphron and Theopompus assigned Homer': *ib.*, p. 494.

It will be observed that these assertions are inferences from certain facts or phenomena of the Homeric language. If, then, these same facts are consistent with other inferences, it is obvious that Mr. Sayce's specific conclusions are no longer binding. Accepting his facts, I deny his conclusions. His certainty is cut down to bare possibility, to be overridden by a stronger.

The following may be premised :—

1. The *Iliad* is not a creation *ex nihilo*; but it is the first thing we have. The first, because anyone comparing the *Iliad* with the *Odyssey* will see that the latter was not prior. One instance is enough, for example's sake :

πόλεμος δ' ἄνδρεσσι μελήσει,

Z. 392,

is evidently the archetype of

πομπή δ' ἄνδρεσσι μελήσει,

λ. 352 ;

and of

τόξον δ' ἄνδρεσσι μελήσει,

φ. 352.

This struck me the very first time I read the *Odyssey*, and years afterwards I was rejoiced to see that Cobet makes

the same remark.¹ We may take for granted that the *Iliad* is the first product of Greek poesy we have :

Minerva, from the Thunderer's brow.

2. Greek metre is not *ex nihilo*. I mean by metre that which, as far as I know, is peculiar to the Greeks, viz. the principle that a long syllable is *δισημος*; that is to say, equal to two short syllables. In every language there must be a natural long and short: *rasped clasp* takes longer to say than *bad hat*; but, as far as I know, the equality of one long and two short is peculiar to the Greeks. Latin poetry was from the time of Ennius as much an imitation as it is at an examination in the present day. But it cannot be believed for a moment that a poet started with the entirely new principle that he would compose in verse of six feet, the metre of each foot being *τετράσημον*. In other words, I believe that the hexameter may have admitted in its infancy and youth trochees in the four first places, as it always did in the sixth. This would vindicate from modernism such lines as

Ιλίου προπάροιθε,

O. 66,

for which Ahrens proposes

Ιλίοδ πρ.

Mr. Sayce accepts Ahrens' conjecture as certainty, and stamps it as Middle Ionic. Of this more anon.

The Epic was probably sung to a stringed instrument, and the twanging of the string would slur over the difference between a trochee and a spondee; and a pause, as in Shakespeare, would mend the prosody.

¹ I am warned that Sengebusch will not have any choristic arguments: this is a pity, for examiners and experts

have hitherto inferred priority from the comparison of two documents.

3. People may talk prose without knowing it, but the primitive Greeks could hardly have conversed in hexameters of 'twenty-four times.' The poet, accordingly, would in some cases alter the common language for metrical purposes on some principle which appeared to him sound, but which more thorough investigation might reject as false analogy. This Virgil has undoubtedly done. But anyone who turns to the prosody in Mr. Monro's Homeric Grammar will see the precision of the Homeric prosody. A vowel before a mute and liquid is shortened only in certain words, and the tendency to shorten is stronger in the *Odyssey*; and this is, I assert, beyond the range of any imitator. It seems plainly a reflex of living speech which was beginning to shorten the vowels in some words. But the critics assume that the poems, to be genuine, must have been composed in the golden age of Greek, when pure syntax and pure prosody governed innocent man, and the dark and evil days of transition and false analogy were all to come. I have no hesitation in asserting that no such grammatical Eden ever has existed on earth, and I hope it never will. But if this be so, what becomes of Mr. Sayce's general proposition, 'that the language of the poems is an artificial one, a sort of curious mosaic, in which archaisms and modernisms, fragments of Æolic, Attic, and Ionic, are embedded side by side?' *Mahaffy*, i. p. 512. If the *Iliad* is in hexameters it must be more or less artificial, but it need not be a mosaic.

Before discussing Professor Sayce's several points, one remark must be made. Professor Mahaffy's *Greek Literature* is a hand-book for the classical student, and contains much valuable information, which it would be hard to find collected elsewhere. On two points, Professor Mahaffy has deserved well of Homeric Controversy; first, by pointing out that the real question as to writing was, whether the author wrote, and not whether his audience read, just

as in the present day the majority of playgoers never read a play at all. Second, that an objector is not bound to produce any creed of his own to replace the one he demolishes. So far, so good; but most people reading the appendix, would imagine that it is mainly due to Professor Sayce, whereas the same view is stated much more temperately in Curtius. Curtius thus describes the Homeric dialect: 'This dialect is the product of a conventional minstrel-usage which preserved a number of very old forms, and sounds regarded as in process of extinction; and in this very way the dialect obtained that character of variety, that luxuriance of forms, and elasticity of rule, which, though almost inconceivable in a language actually spoken, offered immense advantages to the minstrel in the construction of his verse': *Elucidations*, 2nd ed., p. 48; cf. *Gr. Et.*, vol. ii. p. 354. Curtius' statement is decidedly preferable in tone to that of Professor Sayce, who calls the dialect a mosaic, and to that of Fick, who styles it a 'mish-mash.' Whether the latter word is trans-Oxanian or from the shores of the Baltic—the newest home of the Aryan race—is not for me to decide.

To take Professor Sayce's points in order:—

1. *The digamma*.—'A form like ἄκων, instead of the older ἀφέκων, could not have come into existence until all recollection of the digamma had disappeared,' *Mahaffy*, p. 493. Why not? Professor Sayce tells us the digamma survived in some places longer than in others; that it was in common use in Olympia, that it was written in Boeotia up to the third century B. C., and that it lasted in Cyprus up to the fourth century B. C. It was originally a fragile sound. If not, why did it not survive? If, then, it had various periods in various places, and if it was in various stages of decline at the same time, why could not ἄκων and ἀφέκων have existed side by side in the poetical language

of the Ionian bards? Every Ionian town could not, like Warren, have kept a poet. The poet would in all probability have gone, like the troubadour, from place to place, and found the digamma in various stages of decay. With all our advancement, few scholars, few philologists, have as just a view of the nature of language as Horace ;

Ut silvae foliis pronos mutantur in annos ;
Prima cadunt ; ita verborum vetus interit aetas,
Et juvenum ritu florent modo nata vigentque.

If Horace were a philologist, he would have compared language at any given moment to a row of cast-iron railings of the same pattern. It appears that it took two councils of war to decide whether Abercrombie's army should land in gaiters or trousers. Regularity of this kind is not for human speech. In the Latin fragments the word for storeroom, which would have been heard perpetually in every Roman household, *penum*, is found in three genders, and in every form of the five declensions. Again, it is assumed that language changes only in vast periods of time. This argument overlooks the fact that there are concurrent stages of language, like the ripeness of the grapes of Alcinous. Even in the same place language may change rapidly, if there is no written literature. I have taken ἄκων and ἀέκων as a test case, and the judgment regarding them will answer all arguments in favour of modernism from the degeneration of the digamma.

2. *The traces of the various dialects in the language of the Iliad and Odyssey.* There are traces of Æolic and Attic in the two poems. There is no trace of Doric. But, surely, what we call Attic is a differentiation of Ionic—a differentiation, too, which we can trace through Herodotus, through the tragedians, to the unadorned beauty of the Old Comedy. Professor Campbell has given a list of

words 'at once Herodotean and Tragic.' This I annex, to show the strength of the argument :—ἀγηλατέω, ἀμαξεύομαι —ἐπαμαξεύομαι, ἀμίνυτος, ἀνέκαθεν, ἀνθυπουργέω, ἀπόννητος, ἀπότιμος, ἀπωστός, βιώσιμος (= βιωτός), βύσσινος, γενέτωρ, γνωσιμαχέω, ἔδαισα, διαλυμαίνομαι, δράμημα, δυσμορφία, δύσμορφος, δυσπετέως, ἐδώλια, ἐκπαγλέυμαι, ἐλινύω, Ἑλλάς adj., ἰμφορέης, ἱξανασπάω, ἱξεύρημα, ἱξογκόω, ἱξοπτᾶν, ἱηλυσ, εὐεστόω, εὐστομα = εὐφημα, εὐσύμβλητος, εὐφρόνη, ζάπλουτος, ἡμερόσκοπος, θεήλατος, θέσπισμα, Ἰλιάς adj., ἱστορεῖν, ἰσχυαίνω, καθυβρίζω, καθιπνάζομαι, καλλιστεύω, κάρτα, καταντίον, κατοικτίζω, κυματίας, λῆμα, μεταίχμιον, μεταῦθις, μηρόθεν, μιζοπάρθενος, μοχλεύω, μυσαρός, ναυτίλος, νεόγαμος, ξενοκτονέω, ὀδοιπορέω, ὀδόω, ὁμαιμος, ὁμαίμων, ὄρισμα, ὄφρῦη, παιδοποιός, πανώλεθρος, παραμυμνήσκομαι, παρηγορέω, παρθενεύομαι, περιθύμος, Περσίς adj., πέτρινος, πιμελή, πολυπλάνητος, περικλαίειν, πρόνους, πρόφαντος, πύρω, σειράφορος, σκίπων, σίνος, σπασμός, στρατηλατέω, συσπεύδω, τρίβων adj., ὑπέγγυος, ὑπεκτρέχω, ὑπεράχθομαι, ὑπερμήκης, ὑπερτέλλω, ὑπόπτερος, φρενέρης, φυλλάς, χειρωναξία, ψευδόμαντις.—*Sorh.* i. p. 88, n. These, it may be said, are words, not a dialect. But the Attic was the result of a process of selection working through intense intellectual activity. The Attic was a tendency to the selection of the fittest word or form, and the rest were allowed to atrophy. Though this is so, everyone knows that each Attic writer has his peculiarities, both in diction and in grammar; so that even in Attic—the most exclusive of Greek modes of speech—the cast-iron uniformity of emendators and archæologists was never attained. *A fortiori*, therefore, the Ionic would find room for its various products side by side. If the Sanskrit *-asya* was the archetype of the genitive in *-ου*, it is quite possible that *-οιο*, *-οο*, and *-ου* were in circulation simultaneously in different parts of Ionia. *-ου* would be found where the rapidity of circulation had caused greater wear and tear, and *-οιο* would be in vogue in the Sleepy Hollows of the

land. The bard is scarcely to be blamed if he used that form which suited his metre best. *-oio* has an affinity for the hexameter, as anyone will see who humbles himself to the writing of verses. I apologise for even suggesting the menial task.

This assumes that the Greek alphabet of twenty-four letters exactly transliterates the Epic dialect. Now we know that in certain cases, *o* of the old alphabet was incorrectly transliterated, and so of *ε*. We cannot, therefore, tell how far removed *-oio* was from *-o* and *-ov* in common speech; and until we can, it is idle to assume that *-oio*, like a banished Titan, was on one side of a vast gulf, and *-ov* securely on the other. To split Ionian into old, middle, and new, ranged in vertical order, like the strata of geology or a Voltaic pile, is much the same as asserting that at one period there was nothing but infants, next boys, and finally men.

As to the certain forms, of course there were *Æolians* in Asia. It is quite possible that the bards picked up an *Æolism* now and then, just as Burns uses a purely English word. But it is also possible that the mature Ionic and the mature *Æolic* were specializations of tendencies which were latent in the more primitive speech, the *Æolian* keeping nearer to, and the *Ionian* going further from, the mother dialect. Fick's translation into *Æolic* labours under the defect of leaving out any line that presents difficulty. Why not try iambics?

With regard to the digamma one thing has been pointed out, that the last phase of its survival is, as in Pindar, the prevention of hiatus. Mr. Monro points out a similar effect of the French *h*, as *le héros*. A stranger will, I think, observe something similar in the dropping of the English *h*: '*at* is a different sound from *at* the preposition.

3. *Hiatus before words from which no consonant had been lost.*

(a). *ἑίσωρο* Professor Sayce takes from *ἑίμι* = *i-re*. Be it observed that Professor Sayce is bound to prove that *ἑίσωρο* cannot come from anything but false analogy. If it can come from anything else, Professor Sayce's case breaks down. Turning to Monro's *Grammar*, we find the following: — 'Wackernagel (Bezzenberger's Beitr. IV. p. 269) identifies the tense with the Sanskr. *ayāsam*, which would appear in Greek in the form *ἦσα*. He holds that the true Homeric form was *ἦσωρο*, and that this *ἦσωρο*, written in the old alphabet ΕΕΣΑΤΟ, was misread *ἑίσωρο*. G. Meyer refers it to the root *vi*, *vē*, which agrees remarkably in meaning: see Grassmann, Wb. z. R. V. 1311, p. 304, *π*.' That archæologists should ignore the old alphabet is remarkable.

(b).

νεοαρδέ,

Φ 346.

Here, again, Professor Sayce assumes as an absolute certainty that the root is Sanskr. *ārdras*, unless we adopt "the variant reading, *νεοαλε*," *sic*. The variant in Curtius is *νεοαλδε*, and he also suggests *νεαρδε*. Legerlotz takes it from *Farθ*. Döderlein from *ῥέω ῥάζω*, see Ebeling, s. v. The word is *ἄπαξ εἰρ.*, and the second part may have been *Feλ*, as in *ἀελλής*, in the sense of *newly beaten-down*, in which case water would be probably used. At all events, *ārdras* is not certain, and so Professor Sayce fails.

4. *Lengthening before single consonants*.—Of this, two cases are worthy of attention: (a) before *μέγας* and its cognates, and *μέγαρον*. The vowel is lengthened about 200 times. If this is false analogy, as Professor Sayce maintains, why does not false analogy act in the case of other words beginning with *μ*? This is a proof of genuine contemporary sound.

(b) *ἑμμαθε* occurs in Od. 17 and 18 only. There is no trace of a root *σμαθ*. If this is the false analogy of modernism, how are *ρ* and *σ* later than the rest? The phrase in

each case is the same, *κάκ' ἔμμαθεν* ρ, 226, and *κάκ' ἔμμαθες* σ, 362. Both difficulties can be got rid of by reading *κακᾶ μάθεν*, and *κακᾶ μάθες*, the *a* of the neuter plural being probably originally long. This would be an unexpected confirmation of the case. If every instance of lengthening before a real single consonant does not admit of being explained, we must recollect that the point contended for is, that at any given moment some false analogy prevails in a spoken language, and this, consecrated by metre, may generate others. Everything is against Professor Sayce's view, that the epicist lengthened and shortened 'at will.' If this were so, it is difficult to see how we have any prosody.

5. *Other dialects in the Homeric Poems.*—Professor Sayce rightly explains Doricisms as survivals of older Ionicisms among the conservative Dorians. Many of the Æolicisms may be dealt with in the same way; and as has been suggested, *νεφεληγερέτα* and *νύμφα* may have been originally vocatives of invocation, just as most people make nouns of Hosanna and Maranatha.

6. *ἴψ*. This Professor Sayce refers to the fem. *ἴα* = *μῦα* = *σεμῖα*, and so makes it a false analogue. On the other hand, it may be connected with *ἔις* and *ἴα*, which Benfey, Christ., and Pott digammate, = *evana*; *οἶνῃ*, the ace, is given by Pollux as an *Ionic* word, VII. 204: see Curtius, I. 398, and Ebeling, s. v. *εἶς*. The Paphian *ἵγγια* = perhaps *ἔγγια*, though the accent is against this.

7. *ἄν κεν* is found once. 'Such a compound could only have been formed,' says Professor Sayce, 'when all sense of the original meaning of *κέν* had passed away,' *Mah.* 508. In the first place, the general assumption is not true that *ἄν* and *κέν* are identical: see Monro and Ebeling, s. vv. Secondly, the line is

ἄς οὐτ' ἄν κεν Ἀρης ὀνόσαιτο.

N. 127.

Here $\alpha\nu$ goes closely with $\omicron\upsilon\tau'$, and $\kappa\epsilon\nu$ marks the apodosis. We have

$\delta\phi\rho' \alpha\nu \mu\acute{\epsilon}\nu \kappa\epsilon\nu.$

A. 187, ε. 361, ζ. 259.

In this case $\alpha\nu$ goes with $\delta\phi\rho'$, and $\kappa\epsilon\nu$ marks the apodosis.

It would be rather subtle to imagine that the Æolians insisted on having certain hypotheses preserved for the national $\kappa\acute{\epsilon}\nu$, while others, by way of concession, were abandoned to the Ionian $\alpha\nu$. The fact is, $\alpha\nu$ and $\kappa\epsilon\nu$ have separate functions in Homer, and $\alpha\nu$ only is used in negative clauses, where the subjunctive is a future: *Monro*, p. 266, 198-9.

8. $\pi\acute{\iota}\sigma\upsilon\rho\epsilon\varsigma$ is 'an Æolism' says Professor Sayce, *Mah.*, p. 508. But he tells us now 'it is by no means certain whether the Æolic of Homer can be considered to represent one dialect or several,' *Journal of Philology*, 1883, p. 36. So we come to this—Homer is a mosaic, because it contains Æolic, Ionic, and Attic; and the Æolic is again a mosaic, because it may be made up of different dialects, like stage Irish. $\pi\acute{\iota}\sigma\upsilon\rho\epsilon\varsigma$ is 'not Lesbian,' closely allied as it is—

Si non alium longe jactaret odorem
Laurus erat.

The form may have been specialised as Æolic, but it is really a regular shortening from the longer $\tau\epsilon\tau\acute{\omega}\rho\epsilon\varsigma$: *vide* *Monro*, s. v. Professor Sayce is a professor of comparative philology, and as such is bound to notice what other philologists have said, and not merely what supports a foregone conclusion. Anyone can see in *Curtius*, *G. E.*, that the long a splits into e and o , and afterwards into i' and u , i. pp. 65-7; see also Professor Joh. Schmidt, quoted in *Monro*, p. 90. Any hypothesis will do to refute the dogmatist, who claims exclusive rights for his own view. But in every case Professor Sayce's views may be met by

the counter theories of other philologists, of at least equal repute, and of larger resources.

It is clear that the rival theories of Professor Sayce and Professor Fick cannot both 'go home'. Professor Fick undertakes to 'restore' the original, and, like other restorers, leaves little but the canvas. But, according to Professor Fick, there was an original to be scoured and peeled. Professor Sayce tells us there was a mosaic, and undertakes to show how it was put together. The task appears to get rather heavy, for in his *Herodotus* he draws largely on Professor Paley. Professor Paley, however, refers with unction to a remark in the *Athenæum*, that 'two people are required to tell a truth—one to speak it, and another to understand it'—and disclaims having maintained the 'late authorship' of the poems, only 'late compilation,' *Post-Epic Words in Homer*, 1879, p. 27. Then Professor Paley's convert, Dr. Oberdick, maintains that the *Iliad* and the *Odyssey* presuppose 'the full development of Greek poetry, and are based on the old tragedy of Attica,' *Journ. Philology*, p. 41. Which of these is true, aliqui deus viderit. When George III. was told that Wolfe was mad, he expressed a wish that he would 'bite the others,' and considering the success of the *Iliad* and *Odyssey*, there seems to be an opening for an enterprising artist in mosaics.

With regard to the coincidences in the words of Herodotus and our *Iliad* and *Odyssey*, certain questions may be asked. The list may be found in Professor Sayce's *Herodotus*, note, pp. xxxv.-vi. Are not these words amongst the most picturesque in Herodotus, recalling what Grote properly describes as the Homeric vivacity of the Father of History? Why does not Herodotus use the mysterious words like μέρονες and ἀμολγῶ, if they were contemporary products? Where did Herodotus get his epic conception and treatment of the conflict of East and

West? If he had a model, it was an epic; and if the Cyclic epic was another name for the tediousness of Mrs. Quickley, that was not the epic from which the kindred mind of Herodotus drew his inspiration.

9. ἐηλλέδατο.—This is 'etymologically and grammatically an impossible form' says Professor Sayce. Curtius says 'it goes back to a stem ἐλαj-, of which the present would take the form ἐλά-ω or ἐλάζω, and which is to be recognized also in ἡλάσθη, ἐλαστός,' G. E., ii. 295.

10. φῶκαι νέποδες καλῆς Ἀλοσύδνης.—Anyone reading Professor Sayce's remarks would imagine that the derivation of ἀλοσύδνη, = sea-child, was his. It is due to Hesychius, Lobeck, and Curtius. C. refers ἀλοσύδνη to Amphitrite. The φῶκαι are called κήτια, δ. 453, and if φῶκαι = σφοικαι cogn. with φυσάω = σπύω, they would appear to have been some kind of spouting fish. Curtius takes φυσάω from σπύω, s. v.

11. *New Attic Additions*.—One will suffice. ἱρυνκανάω is found only in Homer and Quintus Smyrnæus. Many Lucretianisms reappear only in Apuleius. Lucretius, therefore, is contemporary with that author. I may remark that μιγήσεισθαι is found in K, a book for many reasons suspicious. This Professor Sayce fails to point out.

12. *Verbs in -ίζω, -αίνω*.—Mr. Máhaffy defends verbs in -ίζω by Μηδίζω. Of verbs in -αίνω, Professor Sayce says we should expect to find them 'in Theophrastus, rather than in old Ionic poems addressed to a popular audience.' Surely the poets sang in the halls of the noble and wealthy Greeks, and ἀφραίνειν and μωραίνειν may have been as useful then as now. Critics assume that the Ionic minstrel was of the calibre of Friday after capture.

13. ὄχα.—'The root of ἔχω could never of itself have passed into the meaning given to ὄχα; it was only in combination with ἐξ (as in ἐξέχω) it was able to acquire an intensive or superlative sense,' *Mah.*, p. 514. What does

Professor Sayce do with the intensive sense of ἔχω, either as (a) a verb with a participle; or as (b) a participle with a verb? Any points I have omitted can be investigated in Ebeling and Monro. Professor Sayce's Appendix is found in an authorized book. I point out the antidote.

14.

δέελον δ' ἐπὶ σῆμα τ' ἔθηκε.

K. 466.

δέελον Professor Sayce, following Mr. Paley, makes a substantive. Why? Ebeling, Curtius, Legerlotz, Bollensen, and Brugman make it an adjective. Besides, it is scarcely fair to assume that K is coeval with the earliest *Iliad*. Similarly, few will contend that the solitary passage in which ἥλιος occurs, θ. 271, is the genuine old *Odyssey*.

15. χέρηα and πλείες are 'instances of blundering,' *Mah.*, p. 513. Their vindication may be found in Monro's *Grammar*, s. vv. It is somewhat singular that the School which is shocked by the want of refinement amongst the Greeks can scarcely have a sentence without 'stupid,' 'blunder,' 'false,' 'affected.' The untutored Greek thought that even the special endowments of Achilles did not carry with them a license for scurrility.

16. *False Tenses*.—Of these I will take two types, πεφεύγω, χρυσιμήσω. With regard to such forms as πεφεύγω, there is nothing to prevent them from having been genuine tenses which fell out of use because little called for, like the future indicative with ἀν. It need hardly be pointed out that reduplication is not a sign of tense, but of intensity. The true perfect, as Mr. Rutherford, *Phryn.*, p. 200, has shown, denoted being in the very last stage of completeness; while its later use was to make it a completed præterite. Hence ἤκω is, if a present perfect, exactly, *Here I am, in the act of completing*; and the perfect would be, *Here I am at the end of completeness, but not beyond it*. So the aoristic future. The aorist as such is

not of past tense, except in the indicative, where its pastness is due to augment. Many verbs seem never to have got beyond the radical or aoristic stage. The student of Shemitic is familiar with the fact that the function of a verbal form is to describe time as completed or incomplete, past, present, and future being inferred from the context.

17. Surely ἀγγελίης as a genitive is known since the time of Buttmann: vid. *Lexil.*, s. v., and Ebeling.

18. ἐλώσει, IV. 315.—The variants here are well known, and it is hardly enough to call it, with Professor Sayce, ‘a false resolution’ of the ἐλώσι of Herodotus, *Mah.*, p. 516. Let us hear Curtius—‘that forms like ὀρώω, ὀράας, did not, as a matter of fact, arise *out of* the contracted forms ὀρῶ, ὀρᾶς, but rather, I think, midway between ὀράω, ὀράεις, and ὀρῶ, ὀρᾶς could escape no one who had an open eye to the history of the language’: *Elucidations*, p. 115.

19. ‘γυναιμανής is due to Θηβαιγενής where alone the locative Θηβαι is right’: *Mah.*, p. 516. Why so? γυναικ = γυναικι is the stem: see Ebeling, s. v. Even if it had been originally γυννο, with an Epic lengthening, as in ὑπερήφανος, there would be nothing to marvel at: ἄθανατος is certainly due to the metre: it commenced a foot, and its acquired prosody grew so inveterate that it passed into Attic. In this case the minstrel did vary the common language. Why not in other cases?

The logic of the archæologist is simple: he finds something which at once overrides *omne scibile*. Jack Cade’s title was proved by the bricks in the chimney surviving to this day. But even where genuine antiquities have been discovered, as by Dr. Schliemann, Professor Jebb has shown triumphantly that they cannot affect the notion of Troy as conceived by the Greeks. In one respect Professor Jebb has understated his case. Strabo, in his reference to the *Antenoridæ*, says Σοφοκλῆς γοῦν κ. τ. λ. γοῦν is *at all*

events, whatever others may say. Professor Mahaffy's *indeed* is rather otiose. The point is, that the Antenoridæ were spared, that is, the people, not the house, though, of course, the house would be spared in the first instance. It would take some time to burn Troy. Napoleon calls the second Æneid the work of 'a college tutor, who never had experience of active life.' Scipio, he adds, took seventeen days to burn Carthage, and eleven were required to burn Moscow. Strabo uses the strong word ἀφανισμός, *the wiping out* of Troy. He also states that Antenor got away safe, περισπῶσθηναι, 13, 1, 53. Professor Jebb's point, that the play would have been called ἐν Ἰλίου ἀλώσει, has been misunderstood. He does not mean that the name of a play must repudiate the article under all circumstances, but that in Strabo there is no reason why the play should have the article, and every reason why *the taking of the town* should. πέρις, too, is the word in the Cycle. So that the point is, Sophocles says that Antenor¹ escaped.

Scholarship is scholarship still, in spite of all the archæology in the world. A tendency is at work to make scholar and antiquarian convertible. The scholar deals with words and their relations; the antiquarian, like a miner, depends mainly on luck and chance. How Dr. Schliemann is a 'scholar', as Professor Mahaffy calls him, is hard to see: he has discovered various articles of antiquity: but he has not shown any scholarship, as far as I am aware. He says properly, 'a stroke of a spade' would disprove several antiquarian theories. Is spade-husbandry to figure in the *College Calendar*? Are the candidates for Classical Honors to put in a month at Glencree? Are they to ride camels round the park?

¹ The *Antenorida* is remarkable for the mention of a carrier-pigeon. This may explain why the chorus in the *Oed. Col.* wishes that, like a pigeon, it

could see the issue, and bring home the good news. Attius also had an *Antenorida*.

Political Economy is not in repute, but one principle expressed a truth. Demand produces supply. The Sybarite was fatigued by seeing a man working in a distant field, and in the same way our modern æsthete is troubled by the mere existence of Greek Grammar. It is more precious to gush than to construe. *Punch* has immortalized another specialist of our day, 'Arry. 'Arry makes it his end and aim to bring everything that civilized man admires and respects down to the level of his own nature, and treats 'old Guys' with scant courtesy. But even on his holiday, 'Arry is sometimes quiet, from a wholesome regard—

μή τευ μελαμπίγον τύχη.

THOMAS MAGUIRE.

Feb. 29, 1884.

MISCELLANEOUS NOTES.

SOLON, *ap. DEM. de Falsa Leg.*

Ἐκ γὰρ δυσμενέων ταχέως πολυήρατον ἄστυ
Τρύχεται ἐν συνόδοις τοῖς ἀδικοῦσι φίλους.

ON the second line of this passage Shilleto has the following note:—

“Wastes away in conflicts with those who wrong their kindred and friends.” I conceive the dative τοῖς ἀδικοῦσι is appropriately governed of the verbal σύνodos, as πότμον κλεινοῖς Λαβδακίδαισιν, *Soph. Antig.* 860.’

Surely it is better to regard τοῖς ἀδικοῦσι as the *dativus incommodi*, and to translate:—‘For those who wrong their friends quickly find their much loved city wasted in conflicts by the enemy.’

Compare Hom. *ι* 42 : ὥς μή τίς μοι ἀτεμβόμενος κίοι ἴσης, ‘that I might see that no one should go away wronged’; *Id. A* 250 : τῷ δ’ ἤδη δύο μὲν γενεαὶ μερόπων ἀνθρώπων ἐφθίατο, ‘he had seen two generations pass’; *Soph. El.* 764, *sq.* :

φεῦ, φεῦ· τὸ πᾶν δὴ δεσπύταισι τοῖς πάλαι
πρόρριζον, ὡς ἔοικεν, ἔφθαρται γένος,

and *Ib.* 924, *sq.* :

τέθνηκεν, ὦ τάλανα· τᾱκείνου δέ σοι
σωτήρι’ ἔρρει· μηδὲν εἰς κείνόν γ’ ὄρα.

A few lines earlier in the same passage we read :

· · · · ·
 πλουτοῦσιν δ' ἀδίκους ἔργμασι πειθόμενοι
 · · · · ·
 οὐθ' ἱερῶν κτεάνων οὔτε τι δημοσίων
 φειδόμενοι κλέπτουσιν ἐφ' ἀρπαγῇ ἄλλοθεν ἄλλος.

The frequent juxtaposition of *πλοῦτος ἱερός* and *πλοῦτος δημόσιος*, of *τὰ ἱερά* and *τὰ ἴδια*, as well as the general sense of the context, suggests that the lost line, indicated by asterisks, contained reference to *τὰ ἴδια* or the private personal property of the citizens.

DEM. Cor. 293.

ἀρ' οἷσθ' ὅτι νῦν μὲν στήναι, συνελθεῖν, ἀναπνεῦσαι, πολλὰ μία ἡμέρα καὶ δύο καὶ τρεῖς ἔδοσαν τῶν εἰς σωτηρίαν τῇ πόλει, τότε δ' — οὐκ ἄξιον εἰπεῖν, ἃ γε μηδὲ πείραν ἔδωκε θεῶν τινὸς εὐνοίᾳ, κ.τ.λ.

The editor of the *Catena Classicorum* Edition says that ἔδωκε in this passage has no subject, and suggests that we must understand as its subject the Supreme Δαίμων, as in the elliptical phrases *ᾤει, νίφει, σείει, κ. τ. λ.*

But is it not obvious that αὐ is the subject? 'It is not seemly to mention disasters which have not come to the test, have not been experienced, owing to the good will of some of the gods.' This interpretation is strongly supported by Thuc. vi. 11 :

τὰ γὰρ διὰ πλείστου πάντες ἴσμεν θαυμαζόμενα, καὶ τὰ πείραν ἤκιστα τῆς δόξης δόντα.

The Editor, further, says his suggestion that Δαίμων should be understood as the subject of ἔδωκε is not inconsistent with *θεῶν*, immediately following, because the latter word would describe the minor celestial powers. The distinction he draws is, however, futile, for *θείος* is the

subject expressed (when any subject is expressed) with *ὑεῖ*, κ.τ.λ.; e. g. Xen. *Hellen*, iv. 7, 4, *ἔσεισεν ὁ θεός*.¹

The following points in Liddell and Scott require correction :—

‘*Πέδον*, ου, τό, *the ground, earth*, first in h. Hom. *Cer.* 455, then often in Pind., and Att. Poetry, *πεδῖον* being used in prose, and the only form used in pl.’

This seems to imply that *πέδον* is merely a poetical variety of *πεδῖον*.

But the two words are quite distinct in meaning, *πεδῖον* ‘a plain,’ *πέδον* ‘the ground.’

In all the passages by which L. & S. endeavour to establish the meaning ‘plain’ for *πέδον*, the meaning ‘ground’ or ‘soil’ is not only admissible, but more appropriate.

Æsch. *Prom.* 734, *sq.* :

λιπούσα δ’ Εὐρώπης πέδον
ἥπειρόν ἤξεις Ἀσίδα.

Prometheus says that Io having left the *soil* (not *plain*) of Europe will cross into Asia.

Soph. *Phil.* 1464, *sq.* :

χαῖρ’ ὦ Λήμνου πέδον ἀμφιάλον,
καί μ’ εὐπλοίᾳ πέμψον ἀμέμπτως.

Philoctetes is bidding farewell to the sea-girt *soil* of Lemnos, as in the preceding lines he has done to its fountains, *ib.* 1461, *sq.* :

νῦν δ’ ὦ κρήναι Λύκιόν τε ποτόν,
λείπομεν ὑμᾶς.

¹ I find that Whiston’s Edition, which is several years earlier than the Catena Classicorum, gives substantially the ex-

planation of the passage which I have stated above, but does not adduce the parallel from Thucydides.

Æsch. *Cho.* 1035, *sq.* :

σὺν τῷδε θαλλῷ καὶ στέφει προσίξομαι
μεσόμφαλόν θ' Ἴδρυμα, Λοξίου πέδον,
πυρός τε φέγγος ἄφθιτον κεκλημένον.

'A spot of ground sacred to Loxias' is in apposition to, and explanatory of, 'the temple in the navel of the earth.'

With this may be compared Aristoph. *Pl.* 772 :

ἔπειτα σεμνῆς Παλλάδος κλεινὸν πέδον.

Soph. *El.* 729, *sq.* :

πάν δ' ἐπίμπατο
ναυαγίων Κρισαίων ἵππικῶν πέδον.

At first sight one might suppose that Κρισαίων πέδον was a mere poetical substitute for the more familiar Κρισαίων πεδῖον; but a consideration of the context will show this cannot be so. The passage describes a collision on the race-course, and the Παιδαγωγός (who is the spokesman) says the *ground* was covered with the wreck of the chariots.

To substitute πεδῖον for πέδον in this passage would greatly weaken the force of the description, as will be seen by a comparison of Eur. *Phoen.* 521, *sq.* :

πρὸς ταῦτ' ἴτω μὲν πῦρ, ἴτω δὲ φάσγανα,
ζεύγνυσθε δ' ἵππους, πεδία πίμπλαθ' ἄρμάτων,
ὥς οὐ παρήσω τῷδ' ἐμὴν τυραννίδα.

'To fill the *plain* with chariots,' and 'to cover the *ground* with their shattered fragments,' are two very different ideas. Compare Soph. *O. T.* 180 :

νηλέα δὲ γένεθλα πρὸς πέδῳ (on the ground) θαναταφόρα κείται
ἀνοίκτως.

The fact that πέδον is not found in the plural is a further reason for limiting its meaning to 'ground,' 'earth.'

Θνήσκω—

θνήσκουσι γάρ, κ.τ.λ.

Soph. *O. T.* 118.

τίνι μόρῳ θνήσκεις ;

Eur. *Hec.* 696.

τίνι μόρῳ θνήσκει . . . ἀνὴρ ;

Id. *Bacch.* 1041.

On these passages L. & S. observe that ‘the present (*i. e.* of *θνήσκω*) sometimes takes a perfect sense, *θνήσκουσι* for *τεθνήκασι*,’ and seem to imply that this is an isolated use peculiar to this particular verb, whereas it is often found with verbs expressing an act whose commencement, indeed, was in the past, but whose effects extend to the present. Compare

τὶς δέ μ’ ἐκφύει βροτῶν ;

Soph. *O. T.* 437.

ἀπαγγέλλετε, ὅτι ἡμεῖς νικῶμέν τε βασιλέα, κ. τ. λ.

Xen. *An.* ii. 1, 4.

For other examples, see Curtius’ Greek Grammar, § 486.

In former editions the comment on the usage was ‘sometimes the present is used where we use the preterite’ ; and this seems a preferable mode of expression.

Δυναστεία.—This important word merits a fuller explanation than ‘an oligarchy,’ for it is used by Aristotle of that special kind of oligarchy which is characterized by hereditary succession in certain families, and by the predominance of the personal element in the government. See *Politics*, vi. 5. 2.

Ἀξία.—The meaning ‘proportional’ for *κατ’ ἀξίαν* should be added.

It is contrasted with ‘numerical’ (*ἀριθμῷ*) in the following passage:—*Ἔστι δὲ διττὸν τὸ ἴσον· τὸ μὲν γὰρ ἀριθμῷ*

τὸ δὲ κατ' ἀξίαν ἐστίν (the one numerical, the other proportional). λέγω δὲ ἀριθμῶ μὲν τὸ πλήθει ἢ μεγέθει ταὐτὸ καὶ ἴσον, κατ' ἀξίαν δὲ τὸ τῷ λόγῳ (ratio). οἷον ὑπερέχει κατ' ἀριθμὸν μὲν ἴσον τὰ τρία τοῖν δυοῖν καὶ ταῦτα τοῦ ἑνός, λόγῳ δὲ τέτταρα τοῖν δυοῖν καὶ ταῦτα τοῦ ἑνός· ἴσον γὰρ μέρος τὰ δύο τῶν τεττάρων καὶ τὸ ἐν τῶν δυοῖν· ἄμφω γὰρ ἡμίση. *Ar. Pol.* viii. 1, 7.

Διέκπλους.—Two meanings are given; first 'a sailing across or through, passing across or through'; secondly, 'a breaking the enemy's line in a sea-fight,' which is the usual meaning in Thucydides.

Neither of these explanations suits Thuc. vii. 69, where the sense is 'a *passage* through,' not 'a *passing* through.'

Ὁ δὲ Δημοσθένης καὶ Μένανδρος καὶ Εὐθύδημος ἀραντες ἀπὸ τοῦ ἑαυτῶν στρατοπέδου, εὐθὺς ἔπλεον πρὸς τὸ ζεύγμα τοῦ λιμένος καὶ τὸν παραλειφθέντα διέκπλουν, βουλόμενοι βιάσασθαι ἐς τὸ ἔξω.

The passage is difficult, and Arnold proposes δὴ ἔκπλουν instead of διέκπλουν, but without MS. authority; nor is his suggestion so generally admitted as to justify a lexicographer in ignoring the vulgate reading.

ACCIIUS, *ap.* CIC. *Tusc.* iii. 9. 20.

Quisnam florem liberum invidit meum?

The *in* of the verb *invideo* indicates the direction of the gaze to some particular object 'to look at' as distinguished from 'to see.' Cf. ἐσβλέπειν. The accusative of the direct object is, therefore, naturally employed. 'To look at' soon degenerated into 'to look at with malicious or envious feelings.' 'Who has cast an evil eye on the flower of my children?'

The person upon whose property such malignant gaze is directed is put in the *dativus incommodi*, and thus the

dative with *invidere* originates differently from the ordinary dative after other verbs compounded with *in*, such as *imponere*, *injicere*, &c., in which *in* stands in a direct relation with the dative as a substitute for the accusative or ablative that would be employed if the preposition stood separate.

The accusative of the direct object was often omitted, and probably familiarity with the use of dative of person alone led to the employment of dative of thing, as in Plautus, *Most.* i. 3, 149: 'Qui invident, ne unquam eorum quisquam invideat prorsus commodis,' where *eis commoda*, for *eorum commodis*, would be the more logically accurate construction.

CIC. *Acad. Pri.* ii. 17.

Dubitant (sc. vinolenti), haesitant, revocant se interdum iisque, quae videntur, imbecillius adsentiantur, cumque edormiverunt, illa visa quam levia fuerint intellegunt.

Reid erroneously compares ἀποβρῖζειν with *edormiverunt*, in this passage.

Edormiverunt means 'slept off their debauch'; ἀποβρῖζειν means 'to sleep' or 'to sleep soundly.'

ἐνθα δ' ἀποβρῖξαντες ἐμείναμεν Ἡὼ διαν.

Hom. *ι.* 151.

The following corrections and additions may be suggested for Smith's Latin Dictionary.

Defundere vinum. Diffundere vinum.—These expressions should be distinguished.

On *Vina bibes iterum Tauro diffusa*, Hor. *Ep.* i. 5, 5, Orelli has the following note: 'diffusa, sc. ex doliis in cados, unde doliari opponitur vinum diffusum. Contra defunditur vinum ex cratere in pocula et pateras.'

Cf. Krüger, *l. c.*

Diffundere is, therefore, almost equivalent to 'bottling,' *defundere* to 'pouring out a glass of' wine.

Carectum is explained 'a place covered with sedge,' a definition inconsistent with the article on *carex*, which is distinctly stated not to be sedge.

Cognitio.—In section iii., after the words 'Legal *t. t. a* judicial examination, inquiry,' should be added 'especially of cases decided by a magistrate and not referred to *judices*.' See page 79 of 'Le Magister Sacrarum Cognitionum,' par Edouard Cuq, in the Bibliothèque des Écoles Françaises d' Athènes et de Rome. Fascicule 21.

CHARLES H. KEENE.

I observe that the distinction between *defundere vinum* and *diffundere vinum* is given, and the inconsistency between the articles *carectum* and *carex* removed, in the new edition of Dr. Smith's smaller Latin-English Dictionary, which has appeared since the above notes were written.

C. H. K.

MR. TYRRELL ON MR. SAYCE'S 'HERO-
DOTUS': A REPLY.¹

MY friend and colleague, Mr. Tyrrell, has circulated by anticipation an article on Mr. Sayce's *Herodotus*, written for the forthcoming number of HERMATHENA. The early appearance of this criticism, which is exceedingly hostile, not only in substance but in temper, makes it impossible for Mr. Sayce, who is now in Egypt, to make a prompt reply. I do not stand alone in thinking that this article is unwarrantable.

It seems to me that whatever in the article is not borrowed from Mr. Verrall's criticism of the same book (in the *Cambridge Review* for November 5th) is of so little value as not to be worth publishing by anyone—not to say by a man of Mr. Tyrrell's position.

I have asked several readers of it what amount appeared to them due to Mr. Verrall, and they all had inferred that the last page only contained such obligations. These are the only special points formally acknowledged by Mr. Tyrrell; but he says at the beginning (p. 12), that 'some of the errors now to be pointed out have been noticed by Mr. Verrall. But I have thought it better for the sake of the student to include them in the list which I have furnished.' If this general acknowledgment had been left to stand by itself, it would have been practically

¹ Mr. Tyrrell's article, to which this of the present No. of HERMATHENA.—
Paper is a reply, will be found at p. 11 Ed. HERM.

fairer to Mr. V. ; for when followed by particular references, the reader may infer that these latter, and these only, are the points due to Mr. V. Indeed I should not blame him if he thinks he has not received his due in the article.

For in my opinion very nearly all the solid objections in the list are his. Those which Mr. Tyrrell has added are almost all either—(1) questionable ; (2) trivial ; or, (3) unfairly put. To show this, I must go briefly through the several objections, which are distinguished by paragraphs, and amount to thirty-three.

I insist, that if Mr. Sayce can be shown to have good authority for his notes, whether they be right or wrong, Mr. Tyrrell's dogmatism is not defensible. What approved scholars have printed and reprinted cannot be called *absurd* or *impossible*, even if doubtful.

1—on *Herod.* I. 14 and 152. This passage is taken almost verbatim from Mr. Verrall (1).

Mr. Tyrrell has merely added a parallel passage (I. 14) which he has not translated.

2—on I. 16. Mr. Tyrrell is right in his interpretation ; but, in the first place, he suppresses part of Mr. Sayce's note, which gives and explains the right meaning, though without adopting it. This is not fair. Mr. Tyrrell adds that 'the Greek words could not bear this sense.' Now this is not the case. *γυναικήιος* and *ἀνδρῆιος* do almost always mean *belonging to men* or *women*, and coupled with any other word than *αἰλός* would be rightly so translated. So, then, to borrow Mr. Tyrrell's phrase, 'the student is misled' by his note more even than by Mr. Sayce's. Mr. Tyrrell adds an emendation of the passage cited (in part) by Mr. Sayce from Aulus Gellius, which makes complete nonsense of the passage, and shows that Mr. Tyrrell has never even read the text of the passage which he ventures to emend !

3—I. 30. Mr. Tyrrell is apparently right in his criticism.

4—I. 35. On *Adrastus*, he 'who runs not away,' or 'may not be escaped,' he says: 'Surely the first explanation is inconsistent with all we know of the usage of the word.' Who is meant by *we* in this sentence? It does not include careful readers of Herodotus, or even readers of Liddell and Scott. Let me call his attention to Herod. IV. 142, ἀνδράποδα φιλοδέσποτά φασι εἶναι καὶ ἄδρηστα μάλιστα. He would assuredly not have written his note had this passage been before his mind.

5—I. 39. On this difficult passage, Mr. Sayce's note is taken from that of Stein, the best and most recent Editor. He says nothing which is wrong, or suggests bad Greek. The other leading Editor, Abicht, actually brackets the words τὸ δνειρον. The 'student is *not* "misled,"' and we have still to await Mr. Tyrrell's account of the passage.

6—I. 47. 'χαλκὸν δ' ἐπίεσται. "'Επίεσται is from ἐννυμι." Mr. Tyrrell remarks: 'It is from ἐφέννυμι. Mr. Sayce tells us, that "those who would be saved the trouble of reference to a grammar and dictionary must turn to other editions." His edition does indeed make reference to grammar and dictionary doubly necessary, because erroneous views are forced on those who would otherwise have consulted grammar and dictionary, and would have been saved from error.' It is very amusing that here Mr. Tyrrell, who is so hard on people who will not consult dictionaries, again lays himself open to the same charge. We have already seen a case under (4). The present is another. To charge Mr. Sayce with an error here is not fair. He might have assumed that, having explained the difficult part of the form ἐπίεσται, any intelligent student could supply the rest. But he was presuming too much. For not only does Mr. Tyrrell charge him with an error of omission, but what is far worse, he makes a serious error

himself. *ἐπίσται* is *not* from *ἐπέννυμι*. There is no such verb in Epic or Ionic Greek. There appears to be no such verb in good Attic Greek either. The only authorities for it are Apollonius Rhodius, Dio Chrysostom, and the Anthology. Even Xenophon uses *ἐπέννυμι*. Mr. Tyrrell's *comment* in the above note (not the fact) is taken almost verbatim from Mr. Verrall. Unfortunately, it applies this time to himself, and 'the student is misled.'

7—I. 60. Here Mr. Tyrrell is again on very doubtful ground. He gives a sense to *ἐπεί γε* not found (so far as I know) in either grammars or dictionaries. Abicht, Stein, and L. and S. agree with Mr. Sayce.

8. On the derivation of *Lycurgus*. 'Here, as in other places, when he drops a remark on etymology, the Deputy Professor of Comparative Philology seems to think that *αὐτὸς ἔφα* will settle the matter.' Supply the words *grammar* and *Regius Professor of Greek*, for 'etymology' and 'Deputy Professor of Comparative Philology,' and the quotation will apply still better to Mr. Tyrrell. The point raised is trivial; but Mr. Sayce is quite right, according to G. Curtius.

9—I. 68. Mr. Tyrrell is here obviously right, but makes no new point of value.

10—I. 77. If Mr. Tyrrell had read the context, or consulted Stein's note, he would have discovered that Mr. Sayce is probably right; at least, that he has the highest authority on his side. It is impossible that Croesus' whole army should have been mercenary. Here is Stein's note: *quantum ejus (exercitus) erat mercenarium*, and after quoting other passages he gives *Thuc.* V. 109: *Μεγαρῆς τὰ μακρὰ τεῖχῃ, ἃ σφῶν οἱ Ἀθ. εἶχον, κτείσκαψαν ἐλόντες.*

11—I. 85. Mr. Tyrrell is no doubt right in his view, but wrong in saying that it is *the only possible meaning* here.

12—I. 86. Eight cases of loose or vague translation are here collected. Two come from Mr. Verrall. One is a clear correction; one seems a misprint in Mr. Sayce's book. The rest seem to have been furnished to Mr. Tyrrell by somebody else, for he does not explain or touch on the many difficulties in the meaning.

13—I. 153. On the phrase *τὴν πρώτην εἶναι* Mr. Tyrrell may be right, and has Abicht with him. But Stein is distinctly on the other side, and his version gives us an account of *εἶναι*, which Mr. Tyrrell does not explain. Yet here lies the real difficulty. When he says *the translation given by Mr. Sayce is quite impossible*, it is his mere *αὐτὸς ἔφα*, without any study of the commentators.

14—I. 155. His note is trivial.

15—II. 3. This correction is *perhaps* right, but when he goes on to criticise Mr. Sayce's explanation of *τοῦτο μελετῶν* as 'making it an invariable rule,' he himself runs too far in the opposite direction in translating it by *aiming at this*. It means *taking trouble about a thing*, and, with that view, practising it. Thus, in VI. 105, φ. ἄλλως δὲ ἡμεροδρόμον τε καὶ τοῦτο μελετῶντα (and so often in Attic Greek).

How would *aiming at this* apply here?

16—II. 7. He himself suspects a printer's error.

17—II. 58. Borrowed from Mr. Verrall (3), and trivial.

18—II. 63. Borrowed from Mr. Verrall (4), and the note is, moreover, unfair. Of course Mr. Sayce was not translating *τετράκυκλος* in his note, but giving a piece of archaeological information.

19—II. 125. Borrowed from Mr. Verrall (5), with this misleading addition: *ἐξελεῖν could not mean to choose!!*

20—II. 129. 'ἐκ τῆς δίκης, on account of the decision. This is *quite impossible*. It means *after*, as ἐκ τῆς θυσίης, ἐκ τῆς αἰθρίης.' This is again very misleading. The temporal sense of ἐκ constantly runs into the causal, and ἐκ often means *in consequence of*, and so *by reason of*. Here

again the 'student is misled.' Both L. and S., Abicht and Stein, agree with Mr. Sayce.

21—II. 178. The note is right, but Mr. Sayce is not proved wrong, and with a fair critic would hardly have been suspected; but Mr. Tyrrell never gives him the benefit of a doubt.

22—III. 42. From Mr. Verrall (6).

23—III. 52. The view of Mr. Tyrrell is the right one, but is not 'the only possible one'—a form of dogmatizing very usual with him.

24—III. 65. 'οὐδὲν δέον, without need, or less probably, contrary to right. The rejected explanation is *right*.' Mr. Tyrrell is probably wrong. If he had been familiar with the many parallel passages in Herodotus (I. 119, 186; III. 45; VI. 144, 88) quoted by the commentators, he would have found out that οὐδὲν δέον means *to no purpose* here. Of course, the weight of authority is with Mr. Sayce.

25—III. 82. From Mr. Verrall (7), and moreover, as modified by Mr. Tyrrell, without any point. Mr. Sayce's translation is quite defensible.

26 and 27—III. 108. From Mr. Verrall (8), adding a second part to the note, which appears to me decidedly wrong, viz.: 'In the succeeding sentence Mr. Sayce strikes out γὰρ, remarking "though in all the MSS., γὰρ is unconstruable; ἐστὶ is not to be joined with ἐοῦσα." Now ἐστὶ ἐοῦσα = *est* is a well-recognised Herodotean construction, and so the γὰρ is not only "construable" but indispensable.' I find that Abicht strikes out the γὰρ; Stein brackets it; neither of them joins ἐστὶ ἐοῦσα. I cannot find that this is a well-known Herodotean construction, nor did Mr. Verrall say it was.

28—III. 108. Here Mr. Tyrrell is surely wrong, and in conflict not only with authority, but with common sense. But he may be pardoned on account of the delightful

nonsense he makes. The picture of the father hare solemnly taking up from the ground and recognising his new-born infant, after the manner of a Greek or Roman citizen, is charming. It is, however, more suitable to *Uncle Remus* than to Herodotus.

This curious mistranslation arises from riding a grammatical theory to death. The sense of the passage is perfectly clear, and ἀναυπεῖται must be passive, and mean *is being conceived*.

29—III. 125. From Mr. Verrall (9).

30. Mr. Tyrrell's general inference here is also Mr. Verrall's (10).

31. From Mr. Verrall (acknowledged specially) (11).

32. From Mr. Verrall (acknowledged specially) (12).

33. Already appeared in the *Guardian* review.

Thus, out of thirty-three points which Mr. Tyrrell makes against Mr. Sayce's 'Herodotus,' at least *eleven*—and these far the most important—are taken from Mr. Verrall; of the rest, *ten* are either wrong, or repudiated by the best authorities; *eight* are either quite trivial, or do not convict Mr. Sayce of error.

The remaining four corrections are certainly not worth printing in *Hermathena*, or any other journal.

From these remarks it appears that our Professor of Greek has undertaken to criticise a new edition of 'Herodotus'—(1) without any close intimacy with the text; (2) without consulting any of the newest and most accredited commentaries; (3) without even using his dictionary. Well may we conclude with his own words: 'Get thee to a dictionary—go!'

Mr. Sayce's reputation rests on other grounds than his knowledge of Greek syntax, and his fame has been attained and recognised without any reference to it.

A Professor of Greek, on the other hand, and, moreover, a Professor who enters the field as a slashing critic

in his own subject, cannot afford to neglect any reasonable care and research to ensure his own accuracy.

When he tells us that ἐπεὶ γὰρ means *ever since*; that ἐκ τῆς δίκης cannot possibly mean *on account of a decision*; that the word ἄδραστος cannot be used actively; and that ἀναίρεται cannot mean *is conceived*, we feel that such more than doubtful assertions are a very poor support for the very trenchant tone he assumes.

It is by no means necessary for me to prove Mr. Sayce right, or Mr. Tyrrell wrong, in this argument. What I contend is, that *if the majority of the points at issue in Mr. Sayce's Commentary are fairly defensible, the tone of Mr. Tyrrell's article is indefensible*. That Mr. Sayce is defensible, I have proved by references to the most approved Lexicon and Commentaries; I have also shown that Mr. Tyrrell has omitted to consult these authorities. However excellent a Greek scholar he is, dogmatism without research must sometimes lead him into doubtful ground—I will not say into mistakes.

I insist upon this point, in conclusion: as Mr. Tyrrell has taken up this case as an advocate, so have I; and as advocates have sharp encounters, and even use hard words to one another in court, and still remain the best friends, so our differences, I hope, will exist only as to this question. I trust I shall always appreciate any good and careful work he may do with the same loyalty and generosity that he has always shown towards me.

J. P. MAHAFFY.

MR. SAYCE'S 'HERODOTUS'—REPLY TO
PROFESSOR TYRRELL.¹

PROFESSOR TYRRELL states that he 'cannot see' why I 'should read Herodotus, since it seems to make' me 'so very angry.' I might retort by asking him why he should read my Commentary on Herodotos (if indeed he *has* read it!), since it seems to have the same effect upon him. But I will not refuse him the privilege which he is inclined to refuse me—that of criticising an author whom we believe to have made mistakes.

A 'good few' of the mistakes Professor Tyrrell professes to have detected have already been brought forward by Mr. A. W. Verrall; and as my two assailants follow the same line of argument, while one of them has attacked me in an arena into which I cannot descend, I trust I may be allowed to couple them together here in my defence.

At the outset, I must protest against the whole character of the criticism Professor Tyrrell has directed against me. If he had only gone as far as the title-page, he would have seen that the title of my book is not 'A Critical Edition of Herodotos,' or 'A Grammatical Commentary on the Text of Herodotos,' or anything similar, but—'The Ancient Empires of the East.' In order, however, to leave no doubt about the nature and object of my work, I have spoken in my preface—which Professor Tyrrell implies that he has read—in the following explicit terms: 'The present volume, accordingly, deals with the history, rather than with the language of Herodotos, and with that his-

¹ See Note on page 98.—Ed. HERM.

tory only in so far as it bears upon the East. I have not touched upon philology except where the meaning of a word or name has been cleared up by the science of language, or where I have myself found a difficulty in the grammatical construction or exact signification of a passage. Those who would be saved the trouble of reference to a grammar and dictionary, or who desire to learn what difficulties commentators have discovered in simple texts, and what avalanches of learning they have poured down upon them, must turn to other editions of Herodotos. It is with Herodotos as the historian, rather than as the subject for the dissecting-knife of the grammarian, that I have had to do.' Could anything be plainer? All I was concerned to do was to assist the student of ancient history who wished to read Herodotos as he would read a historical work in French or German, and had no desire to enter into questions of syntactical construction or minutely exact translation. If he had, there were plenty of other commentaries to which he could turn. The only responsibility I assumed was that of selecting in disputed passages the interpretation which seemed to me most consonant with the context and probability. It is true that I had originally ventured to anticipate Gompertz and to suggest here and there revised readings, but I subsequently omitted this portion of the work—a single note, to be considered presently, alone remaining through inadvertence to bear witness to it—as I thought the book already contained quite sufficient to disturb the prejudices of classical scholars. Why, in spite of title-page and preface, I should yet be called upon to enter into questions of syntax and to give translations, which however faithful as renderings, are nevertheless not idiomatic English, I do not understand. I know of more than one commentary on a classical author, written by a distinguished scholar, which contains obsolete or erroneous statements about oriental

history and comparative philology; but should I be justified on that account in declaring that the commentary had failed in its object, and was not a trustworthy work to place in the hands of 'younger students'? I doubt whether Professor Tyrrell or Mr. Verrall would think so.

I do not, of course, pretend that my book is free from errors; no human work can be perfect, and I have had enough literary experience to teach me, alas! that unless a writer is content to be the mere repeater of second-hand knowledge, mistakes are unavoidable. But mistakes are not all of the same kind: there are those which simply prove ignorance and stupidity, there are others which can be made only by a scholar who has ideas of his own; some are the venial errors incident to the treatment of a subsidiary subject, others those which convict a writer of incompetency in the special subject with which he deals. The errors of a scientific explorer are often as instructive as his facts; and he who is afraid of making mistakes may be a good reproducer of other men's labours, but will never increase the sum of human knowledge.

If I may judge, however, from reviews, I do not find that the works of professed grammatical 'scholars' are always immaculate, and Homer is said to nod at times even over his own peculiar vocation of distinguishing the meanings of the Greek tenses. Indeed, my two critics themselves cannot claim that immunity from error which they blame me for not possessing. Thus, Mr. Verrall accuses me—and Professor Tyrrell repeats the accusation—of supposing that τετράκυκλος means 'with four spokes.' Had my two critics been archæologists, they would have known that the note to which they refer is wholly concerned with a subject which is of considerable importance for archæology, and has not the remotest connexion with the meaning of τετράκυκλος. But unlike themselves, I do not require them to be what they do not profess to be,

and only claim from them that elementary knowledge of the principles of textual criticism which a textual critic is bound to possess. Now if we turn to the note in question, what do we find? That it is attached, not to τετρακύκλον, but to ἄμαξαν, and that the *inverted commas which denote translation are absent from the word* 'four-spoked.' If I were to imitate the style of reasoning employed by my antagonists, I should say that anyone who could commit so obvious a blunder ought never to have wielded the critical pen. Similarly, I might argue that one who, like Professor Tyrrell, showed so slight an acquaintance with comparative philology as not to know that *Lykurgos* signifies 'expeller of wolves' is incompetent for the task to which he has applied himself. But I must leave such a style of argument to those who do not profess to 'interpret Hittite or Accadian inscriptions.'

Professor Mahaffy has relieved me of the necessity of replying to the larger part of Professor Tyrrell's strictures. I will, therefore, confine myself to those which he has not answered, at the same time following his notation.

1. Here I had to choose between a periphrastic translation like that of Rawlinson and one which seemed to me to give the general sense, and at the same time was in decent English. I never supposed that the student who was reading the text of Herodotos with a philological purpose would be ignorant of the exact grammatical force of the Greek words, or that the historical student would care what this was, so long as he knew what Herodotos meant to say. But I must now admit that my periphrasis of the first passage allows of a false interpretation, and am grateful to my critics for having pointed it out; as regards the second passage, I still think that the sense is better expressed in current English by my rendering than by a more rigidly correct translation.

3. Professor Mahaffy thinks that Professor Tyrrell

may here be right in his criticism. I do not. Does not Professor Tyrrell know that *καλῶς*, &c., are old cases of nouns?

8. Professor Tyrrell wonders why I should speak of 'stems in *εος*.' He may well do so, but the error does not lie where he supposes. He has never noticed that *εος* is a misprint for *εϋ-ς*! The detection of the misprint ought not to require a very profound knowledge of Greek accidentence.

9. I would ask Professor Tyrrell what is the difference between 'hiring from one who at first would not give it up' and 'hiring from one who would not at first let it'? So far as I am acquainted with my own language, they mean precisely the same thing; only the first expression preserves the radical meaning of the Greek verb, which the second does not.

10. Here I must adhere to the correctness of my view. I cannot see what sense the rendering 'aloof' would make, and etymologically *ἀμφίς* once had the signification which I attach to it.

11. The instances of loose or vague translation here collected are questions of English rather than of Greek, and objections to them would apply only to a translation or a philological edition of Herodotos. I may add, that one of them—'grow tired and begin to drag'—is Rawlinson's rendering. 'Both' of course = the two males.

12. Professor Tyrrell avoids explaining why the note is 'astounding.'

17. Professor Tyrrell and Mr. Verrall, who has already made the same criticism, not only ostentatiously disclaim any acquaintance with Egyptology, but seem to reject any information on the subject which may be offered them. Herodotos, rightly for once, draws a distinction between the *πομπή* or 'procession' and the *πρόσαγωγή* or 'approach' to the temple which was characterized by the use of litanies and hymns.

22. Here my critics are right. My translation is slovenly, and the comment misleading. But of course I did not mean that *τὰ* 'stands for' *αὐτὰ*, though I now see that it was the natural inference from my words.

23. Possible or impossible, I have merely followed Stein's text.

29—III. 125. This is the note to which I have already referred. I cannot believe that Herodotos can have written the past participle. If so, *οὐκ ἀξίως ἀπηγήσαιο* has no sense, since the mode of death which was not fit to be described was the impaling itself. But through inadvertence, when I omitted the first part of my note in which I proposed to read *ἀποκτείνων*, I allowed the latter part of it to stand. Let me add, that *ἀποκ(τείνας)* is a *restoration* of my text by Mr. Verrall; Professor Tyrrell does not seem to have verified what I have really written.

I now come to the concluding portion of Professor Tyrrell's criticism, in which he endorses Mr. Verrall's opinion as to the trustworthiness of the oriental part of my book, and the value of my judgment upon the veracity of Herodotos. As he quotes only one or two of Mr. Verrall's arguments against me, it will be necessary for me to leave Professor Tyrrell for the present, and confine myself to Mr. Verrall, taking in order the criticisms he has directed against me.

In agreement with the general belief of the ancient world, I have been led, by a study of what has been termed 'the archaic classics,' to form a very unfavourable opinion of both the credibility and the veracity of Herodotos. In this, however, I have already been preceded by one of the most acute and learned of living Egyptologists, Professor A. Wiedemann, to whom I have duly acknowledged my indebtedness. It is, therefore, with astonishment that I find my critics ascribing to myself the arguments I have quoted against the veracity of Herodotos, based on his

scrupulosity about repeating the name of a certain Egyptian deity, and on his thefts from the older work of Hekataëos. I can only claim to have added some fresh arguments to those of Professor Wiedemann, derived partly from Egyptology, partly from Assyriology.

These arguments are briefly given and summed up in my Introduction. Their number might have been largely increased, but I fancied that those I gave were sufficiently typical and numerous to convince the unbiassed reader. In most cases I thought it needful only to point out the facts, leaving the student to draw the logical conclusion from them for himself. I learn with surprise that my tone was 'disagreeable,' and that I have endeavoured to teach young men 'to flout a writer of venerable (!) antiquity.' If my arguments are sound, they can be disagreeable only to those who dislike having their prepossessions disturbed; if my facts are correct, how can I be said to 'flout' anyone? To tell your adversary that his tone is disagreeable and that his notes are jibes is not scientific argument. I have put forward as clearly as I can what I believe to be the truth; I have given my arguments and my facts; let them be fairly met and answered, if that is possible, not denounced or obscured by side-issues.

'Mr. Verrall has shown,' says Professor Tyrrell, 'that where we can follow Mr. Sayce, we find him to be by no means a careful reasoner.' Let us see how he has shown it. First of all, Mr. Verrall charges me with having overlooked the words τοῦτον δὲ λέγουσι μηχανᾶσθαι τὰδε, ἐμοὶ μὲν οὐ πιστὰ λέγοντες (II. 73.) when accusing Herodotos of having borrowed his account of the phoenix without acknowledgment from Hekataëos. It is Mr. Verrall himself who has overlooked the point of the argument, the credit of which, as I duly acknowledged, really belongs to Professor Wiedemann. Herodotos is asserted to have stolen his account of the phoenix from Hekataëos. He claims to

have himself seen the creature painted on the walls of the Temple of Heliopolis; but his description of it is so far from the truth (as I have explained in a note on the passage) that it could hardly have been independently invented by two different writers. Hence, as Professor Wiedemann concludes, Herodotos must have plagiarised his account from Hekataeos, while making himself 'responsible for its truth' by pretending that it was the result of his own observation. Now the words which Mr. Verrall charges me with having overlooked *follow*, they do *not precede*, this account. Will Mr. Verrall, and his endorser, Professor Tyrrell, maintain that *τὰδε* in Greek refers to what has gone before?

So much for the first example of careless reasoning on my part: the second is like unto it. I have said that Herodotos asserts 'that Egyptian resembled the chirping of birds' (II. 57.) No, says Mr. Verrall, Herodotos only assumes that 'any language might be compared to bird language by a primitive people who did not understand it.' I find nothing in the passage of Herodotos about 'a primitive people,' or about 'any' language. Herodotos is speaking of Egyptian women, and *giving his own idea* of the reason why the women who spoke Egyptian were not understood. The obvious inference is, that Egyptian had sounded like the chirping of birds to Herodotos himself. The point, however, is a very unimportant one, and I had instanced it by way of illustration only, and not of argument. Consequently, it is not an example of 'loose argument,' as Mr. Verrall asserts. On the other hand, Mr. Verrall comes very near arguing loosely himself when he denies that Herodotos 'assumes an acquaintance with the languages of both Egypt and Kolchhis' in pronouncing them to be alike. How could he have pronounced this judgment if he was not acquainted with them, unless he had either derived the statement without acknowledgment

from some other writer, or else have assumed a knowledge which he did not possess ?

Next Mr. Verrall writes : ‘ Herodotos speaks of “ immense stones ” in Babylonia (I. 186). But “ the country is absolutely devoid of them.” What Herodotos says is that Nitôkris, for the purpose of building a bridge at Babylon, “ caused very large stones to be cut ” (*εἰράμνετο λίθους περιμηκίας*). So far from stating that they were quarried *in Babylonia*—which is what Mr. Sayce’s objection requires—he suggests rather, as was pointed out long ago, by using in the previous chapter the phrase *λίθους ἀγαγομένην* concerning *other* works upon the same river, that the stones were brought from elsewhere.’ This is very curious reasoning. Certain stones were brought to the river—not however, be it noticed, from a foreign country, where alone they could be found ; therefore, *other* ‘ very long ’ stones mentioned afterwards were also brought from some unknown locality beyond Babylonia. Is this the style of reasoning Professor Tyrrell considers ‘ careful ’ in contradistinction to my own ?

Mr. Verrall’s next contention is that the present tense *περιτίθει* (in I. 178.) does not imply an existing state of things. I must leave him to settle this new view of the meaning of the Greek tenses with the Dublin Professor of Greek. .

Mr. Verrall now quotes my note on III. 159 (that the alleged impalement of three thousand Babylonians ‘ is contrary to the usage and character of Dareios as depicted in the Behistun inscription ’), draws an inference from it *which I have not drawn*, then says that the inference is absurd, and calls it an illustration of my judgment in balancing authorities. It is Mr. Verrall, and not I, who has balanced authorities here.

I have argued, that if Herodotos had visited Babylonia he would have known better than to say that rain falls but seldom there. Mr. Verrall objects : ‘ Herodotus says that

in Babylonia the rainfall was not sufficient for agriculture without large aid from artificial irrigation, and in this connexion calls it "little." The objection savours of special pleading; it will not, however, avail Herodotos, since Babylonia was intersected with canals—not because there was too little rainfall, but, as we learn from the native records, because there was too much.

I am next accused of inconsistency. 'No one,' I have written, 'who had visited the district would have called Babylonia Assyria, or have confused the Babylonian with the Assyrian empire.' But, says Mr. Verrall, 'will it be believed that Mr. Sayce himself . . . commences his own description with the words, "Geographically, as well as ethnologically and historically, Babylonia and Assyria form but one country."' The historical student will easily believe it since there is no contradiction in my words. Long before the time of Herodotos Assyria had ceased to exist, and the name had become a mere matter of history. Whatever might have once been the case, a traveller of his age would have heard no name in Babylonia itself but that of Babylonia (or Khaldea). The obsolete name of Assyria could only have been derived from some older writer who lived before the fall of Nineveh and the rise of the Babylonian empire. Mr. Verrall cannot have read my Appendix very carefully; otherwise he would never have committed the error of supposing that I had contradicted myself.

It is just the same with another alleged contradiction which Professor Tyrrell has taken under his patronage. In my note on II. 41, I have noticed that the cow was sacred to Hathor and not to Isis, and on p. 343 I again say the same thing, adding that in one of her forms, as mother of Hôros, Isis was named Hathor. Mr. Verrall garbles the passage, and so misleads Professor Tyrrell, who has clearly not troubled himself to see what it was that I really wrote.

Mr. Verrall next says: 'Mr. Sayce, who contradicts almost every sentence in the chapter (II. 36.) says upon this, "All classes alike shaved the head," as if this were inconsistent with the text, and does not even notice that immediately afterwards Herodotus himself says that the Egyptians in general shaved.' As I do not say that my statement is 'inconsistent with the text,' Mr. Verrall's inference and assumption are alike unwarranted. Is this not 'to read your own meaning between the lines'?

The criticisms which follow are all conceived in the same strain. 'Herodotus says that all the Egyptians, without exception, drank out of bronze cups (II. 37). Mr. Sayce converts this with an assertion "that the Egyptians used only bronze cups" (p. xxxii.), and gives a note to disprove it.' The context ought to show the dullest reader that 'used' means 'used for drinking purposes'.—Herodotos asserts *ἱερᾶται γυνὴ οὐδεμία* (II. 35). This was contrary to the fact, not only in the time of Herodotos, but both before and after him. Egypt was a conservative country. Hence, when I say that Herodotos, in speaking of the Theban priestesses who were kidnapped by the Phoenicians, shows that he knew of the existence of priestesses in Egypt, I am *not* making 'an allegation which we can ascertain to be erroneous.' It is again Mr. Verrall who has started a mare's nest, through his ignorance of Egyptian history and institutions. Before doing so, he had better have waited to hear what the Egyptologist had to say.—'Perhaps a little collection on p. 159 (notes 4, 5) is as curious as any. *ἔστι δὲ καὶ τῶν ἱερῶν ἡ μαντικὴ ἀπ' Αἰγύπτου ἀπιγμένη*. "Divination by victims. This was not confined to Egypt and Greece, as Herodotos imagined." How does it appear that Herodotos imagined so?' In this way. Herodotos is arguing that the oracle of Dôdôna was founded by an Egyptian priestess. He supports his view by three supposed facts: (1) that the kind of divination

practised at Dôdôna and in Egypt was similar; (2) that divination by means of victims came from Egypt; (3) that the Greeks learned to institute festivals and processions in honour of the gods from the Egyptians, since they had long existed among the Egyptians, and only for a short while among the Greeks. I am afraid it will not be the Assyriologist only who will think that Mr. Verrall has here failed to follow the argument of Herodotos.

Mr. Verrall now turns to Greek history. I have disputed the assertion of Herodotos, that there was less contempt for artisans at Corinth than anywhere else in Greece. 'In Athens, where the democracy could be led by Kleôn, the leather-seller, and Hyperbolos, the lamp-maker, it influenced public life considerably less than at Corinth.' Mr. Verrall asks, 'Where is the proof that there was no leather-seller or lamp-maker among the public men of Corinth in the middle of the fifth century?' Had there been, we are likely to have heard of it; at all events the subsequent history of Corinth pre-supposes that there was not. Mr. Verrall's other question—What has the Athenian democracy after Periklês to do with a remark which was written during the lifetime of Periklês?—may be answered by a study of Grote. We know pretty well the political condition both of Athens and of Corinth at the beginning of the Peloponnesian War—the time to which the remark belongs—and what we know is not favourable to Mr. Verrall's criticism. When he says that 'the Athenian democracy was under the almost absolute control of one of the best-descended men in Hellas,' he forgets the conditions under which the control was exercised, as well as a certain little episode that occurred towards the close of it. In any case, a State in which Periklês was succeeded by Kleôn could not have suffered very recently from a contempt for artisans.

I have now gone through all Mr. Verrall's criticisms,

and think I have shown good grounds for transferring to him the judgment Professor Tyrrell has pronounced upon me, to wit, that he is 'by no means a careful reasoner.' It is at all events not such reasoning as the Orientalist would admit in his studies; and if it is a specimen of what is accepted in 'classical scholarship,' the less the Orientalist has to do with 'classical scholarship' the better. As it is endorsed by Professor Tyrrell, I must infer that he too considers it to be a model of what 'careful' reasoning and historical argument should be; for I cannot suppose that he has given it his approval without having first taken the trouble to see what it is worth. Mr. Verrall is a brilliant textual scholar, but he has proved that he has still much to learn before he can become a historical critic, much more venture to criticise the historical criticism of others. My judgment as to the veracity of Herodotos may be mistaken, and the arguments by which I have supported it may be answerable; but we have still to wait for the apologist who shall show them to be so. The least we can expect from him is, that he shall display an acquaintance with the canons of historical evidence, and know something of that evidence itself, which, in the case of Herodotos, involves a knowledge of Assyriology and Egyptology. All that Mr. Verrall has proved is, that he has (1) misunderstood the point and meaning of my arguments; (2) has failed to follow the reasoning of Herodotos; and (3) has made me say what I do not. And this is the sort of reasoning that Professor Tyrrell holds up before me as a model for me to follow!

Professor Tyrrell's last question will be answered by a reference to my article on 'Grammar' in the new edition of the *Encyclopædia Britannica*.

A. H. SAYCE.

MR. TYRRELL'S REJOINDER.

MR. MAHAFFY and MR. SAYCE have thought it wise to endeavour to answer my criticisms on certain grammatical errors made by Mr. Sayce. Perhaps they would have acted more wisely in obeying the precept

μη κίνει Καμάρινα, ἀκίνητος γὰρ ἀμείνων.

Mr. Sayce ought to have followed the example of the 'least trustworthy of the Royal authors', Sennacherib, whom he praises for omitting to allude to his overthrow in Palestine. Scholars would have said 'it was not worth while to point out blunders which every fairly intelligent schoolboy could correct for himself.' But now no such view can be taken of my Paper. Messrs. Sayce and Mahaffy fancy they can defend the errors which I have exposed, and it may be that there are others entrusted with the business of education who share their delusion.

I will take Mr. Mahaffy's Paper first, as it was written first, and is accepted by Mr. Sayce as a statement of his case except in a few details.

The first and most important argument of Mr. Mahaffy is that many of Mr. Sayce's mistakes had been before pointed out by Mr. Verrall. This is quite true. I wrote for the students of Trinity College, Dublin, and for junior masters in schools, who do not read the *Cambridge Review*, and who do read HERMATHENA, or at least acquire a knowledge of the views propounded therein. But Mr. Mahaffy thinks he has sufficiently answered any criticism of mine by showing

that it has been already made by Mr. Verrall. I can assure Mr. Mahaffy, it was not because I hoped to prove my possession of deep and curious erudition that I pointed out that *τὰ* is a relative pronoun in Hdt., and that in a certain passage Mr. Sayce is mistaken in supposing that it could stand for *αὐτά*. I pointed out this fact because I wished to save junior students from error. But I am now disposed to be very proud of this note, inasmuch as Mr. Mahaffy seems to think it such a profound linguistic discovery that I could not possibly have made it myself—I must have gained this Titanic truth from Mr. Verrall, trusting on the authority of whose name I dared to enounce a doctrine so subtle and so startling. Yet, incredible as it may seem, I had made this discovery before Mr. Sayce's book was two minutes in my hands. Some Erinnyes which haunts the Hittites has caused my copy of his work to open at p. 249. Struck by the very curious note, that *τὰ* was for *αὐτά*, I went through the other footnotes, and found all the rest, quite independently of Mr. Verrall's Paper, which I had not seen at the time.

Until I read Mr. Mahaffy's Paper I should have said with confidence that there was not a single error pointed out by Mr. Verrall and me in common (not to speak now of the rest) which would not have been at once observed and corrected by anyone acquainted with elementary Greek grammar and usage. I find now that Mr. Mahaffy would have accepted nearly all of them, including the very worst, as sound comments.

It is really highly amusing to observe how Mr. Mahaffy secretly admires our obvious corrections. 'Indeed,' he writes, 'I should not blame Mr. Verrall if he thinks he has not received his due in the article.' He fancies that Mr. Verrall will be jealously tenacious of his right in corrections which he probably could have made ere he had completed his third *lustrum*. Mr. Mahaffy says that he went about and asked several of his friends 'what amount appeared

to them due to Mr. Verrall'—so I infer that Mr. Mahaffy's friends share the astonishment with which he regards the discovery that *τὰ* is a relative pronoun in some Greek writers, and other like truths. In the opinion which Mr. Mahaffy's friends formed as to the extent of my indebtedness to Mr. Verrall they were perfectly right. Except the comments which I especially ascribed to Mr. Verrall on p. 20, there was nothing which I had not observed independently of him—nothing, indeed, which could possibly pass unnoticed by one who had even a slight knowledge of the structure and usage of the Greek language. I may add that I wrote to Mr. Verrall when I had read his Paper, telling him that I had observed the errors which he had pointed out, and many more, and asking whether I might refer to the Paper in the *Cambridge Review*, signed A. W. V., as his. He at once acknowledged the Paper to be his, and gave me permission to ascribe it to him.

All the comments to which there is no answer but 'made before by Mr. Verrall' I regard as cloaked admissions of indefensible error. Mr. Verrall's review did not (unfortunately for Mr. Sayce) trammel up the consequence, and preclude all future reference to the errors which he exposed. Nor will my strictures have that effect. I venture to predict that Mr. Sayce will hear more about them than I have said, or mean to say.

Before I deal with Mr. Mahaffy's points in detail, I must premise a few observations. Hdt. I., 153, τοὺς Ἴωνας ἐν οὐδενὶ λόγῳ ποιήσαμενος τὴν πρώτην εἶναι is thus translated by Mr. Sayce, 'accounting the Ionians to be in no way his first object.' Mr. Mahaffy's comment on this passage distinctly implies that this is a possible translation. This being so, I might here finish my Paper, for if anyone thinks this a possible rendering, his opinion on questions of Greek Grammar may safely be neglected.

Next, Mr. Mahaffy often says 'Mr. Tyrrell has not trans-

lated the passage,' or 'has not given his own view.' I wished to make my Paper as short as possible, and I did not care to translate passages the meaning of which was obvious to everyone, except (apparently) Mr. Mahaffy. I did not wish to imitate the style of *Little Arthur's History of England*. 'Now, you must know, my dear little Arthur,' seemed unsuitable to the pages of HERMATHENA.

I now take Mr. Mahaffy's defence in detail. With it I shall review Mr. Sayce's answers so far as he has arranged them under Mr. Mahaffy's notation. His general answer I shall afterwards consider.

I. 14. Mr. Mahaffy abandons the defence of the mistake involved in Mr. Sayce's note here and on I. 152. Mr. Sayce does not seem to think it makes much difference. Yet here archæology has to give way to rudimentary grammar. Mr. Sayce's interpretation was forced upon the Greek to illustrate the fondness for silver which he says prevailed amongst the Hittites. 'A very considerable number of silver offerings were made by him in Delphi' is quite different from 'most of the silver offerings at Delphi were his.' It is not the same thing to say that a man has a very large sum of money in the Bank of England, and to say that he has most of the money in the Bank of England. The latter statement would be hardly more absurd than the statement here forced on Herodotus in defiance of grammar as well as common sense. The whole purport of the sentence is this—Gyges is said to have made many offerings of silver at Delphi, but to have signalized himself by his offerings of gold. The meaning of the whole passage, including ἀλλὰ, to which Messrs. Mahaffy and Sayce are profoundly indifferent, is: 'he sent presents to Delphi not a few, on the contrary among the silver offerings (to take the silver offerings) a very large number at Delphi are his; but over and above these he presented a vast deal of gold.'

I. 16. Mr. Mahaffy advances the extraordinary doctrine

that 'γυναικίος and ἀνδρίος coupled with any other word than αὐλός would be rightly translated *belonging to men or women.*' What then is the mystic virtue in the word αὐλός? Mr. Mahaffy might as well say that γυναικίος might mean *belonging to a woman* on every day of the week but Thursday, on which day it must always mean something else. The fact is, that the word γυναικίος could not be used in prose to mean 'belonging to (carried by)' a woman. It might be so used in poetry, like the Νεστορίη παρὰ νηί of Homer, which would be quite unsuitable to prose. As to the passage from A. Gellius, I wrote 'either he was not referring to this passage, or he misunderstood it, or his text is corrupt.' I offered three hypotheses, any of which I would accept before allowing that γυν. αὐλ. could mean 'a flute belonging to a woman' in this passage. One of these alternatives is true. Gellius misunderstood the passage. This is enough for my purpose.

I. 30. Mr. Mahaffy says I am right. Mr. Sayce says καλῶς, &c., are old cases of nouns; but was this fact present to the mind of the Greek writers? Why should the origin of adverbs affect their construction in a few isolated cases; and not in every case, or in none? I shall afterwards have to give my opinion on the value of isolated comments on etymology.

I. 35. Mr. Sayce's explanation is inconsistent with all we know of the usage of the *name*, which is plainly kindred in sense to Adrasteia. Adrastus is the Man of Fate. Perhaps I should rather have written *name* than *word*. But a proper name is rightly described as a word in commenting on its meaning. The passage to which Mr. Mahaffy refers, and with which I am familiar, does not in the least bear on the meaning of the *name*. The general meaning even of the *word* is not affected by an isolated peculiarity of usage. It would be absurd to quote 'questionable shape' in Hamlet, as against the statement that the general sense of the word *questionable* is 'open to doubt.'

I. 39. Mr. Mahaffy speaks of this as a difficult sentence, and says we have still to await Mr. Tyrrell's account. I can see no difficulty in the passage, except that we have again to apply Mr. Verrall's astounding and epoch-making discovery that $\tau\acute{o}$ is relative. Mr. Sayce's translation is fairly right. 'Now as to what you do not understand,' &c., would have been clearer. But the suggestion of $\alpha\lambda\lambda\alpha\ \gamma\alpha\rho$ shows that he did not understand the construction. He wrote a correct note, as Aristotle would say, 'by chance or at the suggestion of another.' I would say with Shakspeare¹ slightly adapted, that "The note itself was a good healthy note, but, for the party that owed it, he might have more diseases than I knew for."

Here is my account which Mr. Mahaffy awaits. The sentence means 'As to that which you do not understand, but (wherein) the meaning of the dream has escaped you'; the words $\kappa\alpha\theta'\ \delta$ are to be supplied in the second clause from the sense of the first clause.

I. 47. $\acute{\epsilon}\pi\acute{\iota}\sigma\tau\alpha\iota$ is from $\acute{\epsilon}\phi\acute{\epsilon}\nu\nu\mu\iota$. The practice of all grammarians is to refer a form to the Attic pres. indic. existing or assumed. I take up Pratt and Leaf's *Story of Achilles*, and find in *Il.* I. 149, ' $\acute{\epsilon}\pi\acute{\iota}\mu\acute{\epsilon}\nu\epsilon$ perf. part. of $\acute{\epsilon}\phi\acute{\epsilon}\nu\nu\mu\iota$.' Of course there is no $\acute{\epsilon}\phi\acute{\epsilon}\nu\nu\mu\iota$ in Ionic; but to say that $\acute{\epsilon}\pi\acute{\iota}\sigma\tau\alpha\iota$ comes from $\acute{\epsilon}\phi\acute{\epsilon}\nu\nu\mu\iota$ does not imply that there is. I remember myself being asked at an examination what $\kappa\alpha\tau\alpha\gamma\acute{\iota}\zeta\epsilon\iota$ in Herodotus II. 47 comes from. The answer was of course $\kappa\alpha\theta\alpha\gamma\acute{\iota}\zeta\omega$. The answer $\kappa\alpha\tau\alpha\gamma\acute{\iota}\zeta\omega$ would have been wrong. But it is contended that there was no Attic $\acute{\epsilon}\phi\acute{\epsilon}\nu\nu\mu\iota$. Apollonius Rhodius is not good enough authority for Mr. Mahaffy, and he adds, 'even Xenophon uses $\acute{\epsilon}\pi\acute{\iota}\epsilon\nu\nu\mu\iota$.' So that for some extraordinary and unexplained reason the Attics treated $\acute{\epsilon}\nu\nu\mu\iota$ differently from all other verbs digammated or not. We have in $\acute{\epsilon}\nu\nu\mu\iota$ another

¹ 2 Hen. IV. i. 2.

word *sui generis* like αὐλός above. The fact of the matter is this—The Attic writers treated ἔννυμι like all other verbs. Xenophon when he uses the phrase γῆν ἐπίτρεσσθαι is quoting a traditional archaic expression. Just in the same way one would now write ‘the land o’ the leal,’ though *of* is not elided in correct English; or ‘understanded of the people’; or ‘the quick and the dead.’ Hesych. gives γῆν ἐπίτρεσσθαι as meaning ταφῆναι, and the phrase is as old as Pindar and Simonides, probably much older. If one now wrote ‘understanded of the people,’ or even ‘the quick and the dead’ one might (or might not) add inverted commas. But you must know, my dear little Arthur, that the poor Greeks were heathens, and had no inverted commas. Yet we must not despise them because they had not the blessings which we enjoy. So much for Mr. Mahaffy’s discovery, which he has thought so important that he calls attention to it by the use of italics. His criticism is wrong in principle, for he supposes that ἔννυμι could be treated differently from other verbs, digammated or not; and wrong in fact, because he misunderstands the significance of the passage from Xenophon. But had he been completely right, his comment would have been so infinitesimally trivial as to be contemptible. As well might a critic write ‘Mr. Tyrrell has made a serious blunder; he has described so and so as a Quaker; now, he is a member of the Society of Friends.’

I. 60. I am said to give an account of ἐπεὶ γε not found in grammars or dictionaries. I gave no account of ἐπεὶ γε, but of ἐπεὶ, which, I hold, means *ex quo*, not *quoniam*, in this passage as in many others; γε has its usual sense, ‘at least,’ or ‘I presume’; ἐπεὶ gets its force from the sentence, which shows whether it means *ex quo* or *quoniam*; γε may be added, if required, in both cases. The words εὐηθέστατον μακροῦ demand a *terminus a quo*. This has strangely escaped the observation of the editors of Herodotus. But those who have an instinct for Greek will, I venture to think,

accept my suggestion. It has already been heartily accepted by some scholars. I now prefer ἐπέλ γε to ἐπέλ τε here.

I. 65. Mr. Sayce says that 'it ought not to require a very profound knowledge of Greek accident' to discover that when he printed 'stems in εοϛ' he meant 'stems in ευ-ϛ.' No knowledge of accident or of anything could, I think, have led me to this conclusion. It certainly does not look like a misprint. Why should I have taken it for a misprint? I admit that εοϛ for ευϛ would be a natural misprint, but not εοϛ for ευ-ϛ, and the presence or absence of the hyphen makes all the difference between right and wrong.

I think it is quite doubtful that Lycurgus means '*expeller of the wolves*.' It is otherwise explained by Fick, who is sober though a philologist. But even if it did mean 'expeller of the wolves,' *non sequitur* that it means 'expeller of the wolves of *anarchy*.'

Besides, an isolated etymological note is utterly valueless. Etymology well deserves to be studied by itself; but what does a student gain from one note on etymology in twenty pages? Anatomy is a most valuable study. But it would be absurd in a classical editor to write as a note (say) on the word φαγεῖν, 'swallowing is divided into prehension, mastication, deglutition, &c. Appended is a diagram of the palato-pharyngeal process.'

Mr. Mahaffy, in saying that 'Mr. Sayce is quite right according to G. Curtius,' is himself quite wrong. G. Curtius makes the latter part of the word mean *hineindrängen* or *herausdrängen*, but I cannot find that he pronounces on the former portion at all. Mr. Sayce makes this etymology a sort of crucial test: before all things it is necessary that one should know that Lycurgus means 'expeller of wolves.' I hold this to be very doubtful. Other etymologists see in the latter part of the word ἐργ- (in ἔργον) or ὀργ- (in ὀργή), and

in the first the $\lambda\upsilon\kappa$ - in $\lambda\upsilon\kappa\acute{\alpha}\beta\alpha\varsigma$, signifying 'light.' The earliest Lycurgus of whom we hear is the enemy of the worship of Dionysus. 'Expeller of wolves' does not seem suitable to him.

I. 68. Mr. Mahaffy says I am 'obviously right, but make no new point of value.' I never proposed to make a new point of value in this note. I proposed to point out a mistake. Mr. Sayce says that 'give up' is as good a translation as 'let.' Would Mr. Sayce translate ἀποδόσθαι to 'give away,' or to 'sell'?

I. 77. I am quite certain that αὐτοῦ is not the partitive genitive. But this does not necessarily imply that the whole army of Croesus was mercenary. The words mean, 'the army which was mercenary belonging to him' (i.e. in his pay). This is the natural meaning of the words. If Messrs. Mahaffy and Sayce do not see this, I cannot make them see it. *I refuse to accept the verdict of Stein or any other editor as final on this or any other passage.* Mr. Mahaffy calls Stein 'the best and most recent editor.' He always regards the most recent German editor as the best, and holds it to be a 'serious blunder' not to accept all his views. Now the following is a note of Stein which no scholar can possibly accept. On I. 155, κεφαλῇ ἀναμάξας (on which Mr. Sayce has the 'astounding note,' presently to be reviewed), Stein writes, 'zu den vereinzelt ἀναμάξειν ist ein Praesens ἀν-αμάγειν (ἀμ-άγειν cogere, coacervare; davon ἄμαξα Lastwagen) anzunehmen.' Such a verb as ἀμάγειν, ἀναμάγειν is altogether impossible in Greek. It is hardly necessary to remind scholars of Scaliger's *regium praeceptum*, that no verb can be compounded with any part of speech, except a preposition, without changing its form. The mistake involved in ἀμάγειν is an exaggeration of the well-known mistake in the formation of the word *telegram*. *Telegram* implies τηλεγράφω, a monstrous form like ἀμάγω. The only possible composition

would be τηλεγραφίω, which would give *telegrapheme*. The verb ἀμάγω is as impossible a form as could be suggested, except, perhaps, ἀναμάγω. Surely here Stein is a stone of stumbling and a rock of offence. Yet Messrs Mahaffy and Sayce pronounce him to be the best editor of Hdt., apparently only because he is the most recent. The inferior (because a little less recent) Abicht of course refers ἀναμάξας to ἀναμάσσειν.

I. 85. Mr. Mahaffy says I am, no doubt, right in my view, but wrong in saying that it is *the only possible meaning* here. It is the only possible *right meaning*. I never meant to say that there might not be many erroneous interpretations given, and I am still less likely to say so now. The only possible meaning is, 'It is far better that this (the cry of your new-born babe) should be far from you'; *i. e.* 'should be never heard by you.' Ἀμφίς could not possibly mean 'in every way,' and if it could it would not suit the sense here.

I. 86. As to the examples of loose or vague translation brought together under the note on I. 86, of these no defence is attempted by Mr. Mahaffy. I have only to add that 'repels it into the upper parts of the air' is not a loose translation, but a very serious error. The meaning is, 'drives it into the upper parts *of the country*.'

I. 153. τοὺς Ἴωνας ἐν οὐδενὶ λόγῳ ποιησάμενος τὴν πρώτην εἶναι. Mr. Sayce renders 'Accounting the Ionians to be in no way his first object.' This is of course quite impossible, and this is one of the worst mistakes into which Mr. Sayce has fallen. I corrected thus 'taking no account at all of the Ionians at first.' Mr. Mahaffy says my version does not explain εἶναι. I was not writing a commentary. *I translated εἶναι* in the same way as Stein and Abicht. In no case did I enter into annotation or illustration; τὴν πρώτην εἶναι means 'at first'; the εἶναι is pleonastic, as in τὸ νῦν εἶναι, τὸ τήμερον εἶναι,

τὸ σύμπαν εἶναι. Mr. Mahaffy says, 'Mr. Tyrrell may be right, and has Abicht with him; but Stein is distinctly on the other side.' That is, Stein sanctions the elementary blunder of Messrs. Sayce and Mahaffy. Here is Stein's note:—'τὴν πρώτην εἶναι, "fürs erste," wie τὸ νῦν εἶναι "für jetzt," τὸ σύμπαν εἶναι "überhaupt."' Stein explains the words in the very way in which I translated them; Abicht (as Mr. Mahaffy says) does the same. Now I should be sorry to accuse Mr. Mahaffy of deliberate falsification of a piece of evidence to screen himself and his friend. But, rejecting this alternative, we are forced to infer that Mr. Mahaffy misunderstood the German note. Yet I have always been led to believe that Mr. Mahaffy is so imbued with German that he finds it highly inconvenient to write correct English. When Mr. Mahaffy says, as he often does, 'Mr. Sayce has the highest authority on his side,' let us remember his comment here.

I. 155. Mr. Sayce writes: 'Professor Tyrrell avoids explaining why the note is "astounding."' I will explain now. Mr. Sayce has forced me to disclose the very worst error in his book.

I called Mr. Sayce's note astounding because I could not get from it any meaning except that Mr. Sayce thought that κεφαλῇ ἀναμάσσειν meant 'to think of,' and that he got that meaning through the intermediate conception, 'to work up with the head.' Hence it seemed that he thought κεφαλή might signify the *intelligence, reason*, as we use *head* in English, when we say that a 'man has a good *head* for figures.' Such a blunder appeared to me impossible. But it seems I was too charitable. That Mr. Sayce should think that κεφαλή can mean the *head*, in the sense of the *thinking* organ, is really astounding. Mr. Mahaffy thinks my criticism of the note 'trivial'; so he evidently agrees with Mr. Sayce. This, too, I regard as astounding. I shall not regard any future comment by Mr. Sayce or

Mr. Mahaffy as astounding. I shall be prepared for it by this.

II. 3. Mr. Mahaffy thinks my correction is *perhaps* right. He is careful to italicise *perhaps*, lest I should be too much elated. As to μελετῶν, I cannot do better than refer him to Liddell and Scott, in whom he reposes such a touching faith.

II. 7. I *did* suspect a printer's error. I am not so sure now, since I have discovered the meaning of the note on κεφαλή.

II. 58. Mr. Sayce explains that 'the προσαγωγή or approach to the temple was characterised by the use of litanies and hymns.' But his note says 'προσαγ. refers to the litanies and hymns.' Again I ask, was Mr. Sayce thinking of προσφθία or τὸ προσόδιον (μέλος)? These words *refer* to hymns, προσαγωγάς does not. Mr. Sayce says προσαγ. refers to litanies; I say it does not. Is this a trivial difference, as Mr. Mahaffy says?

II. 63. Not only I but Mr. Verrall (the author of the immortal canon about τὰ) thought that Mr. Sayce believed τετρ. ἄμ. to mean 'a chariot with four-spoked wheels.' There are errors worse than this in the edition. Why, then, should we not have taken the note in its natural sense?

II. 125. ἐξελεῖν could *not* mean to 'choose'; ἐξελεῖν is 'to take out from a number of other things,' ἐξελεῖσθαι is 'to choose'; when ἐξελεῖν is further qualified, as by γέρας or ἔκκριτον, in meaning it approaches the middle; but this is the very reason why anyone who values accuracy should never render ἐξελεῖν 'to choose,' and should reserve that rendering for the middle. Of course in this passage it means 'to take out.' Regard to the distinctness in meaning of the middle voice is of primary importance in the study of Greek. It will, of course, seem quite unimportant to those who have no κεφαλή for language, as Messrs. Mahaffy and Sayce would say.

II. 129. A similar observation may be made on Mr. Sayce's translation of ἐκ τῆς δίκης, 'on account of his decision'; ἐκ always implies consequence. Mr. Munro justly insists that *de* is never purely causal, but always implies consequence. So does ἐκ. Of course, consequence and causality run into one another. But this is the very reason why we should not confound them. I should not have so strongly condemned Mr. Sayce for writing 'on account of his decision' in a translation of Hdt. But his notes are few, and scattered. He only gives them 'where the meaning of a word or name has been cleared up by the science of language, or where I myself have found a difficulty in the grammatical construction or exact signification of a passage.' This is the only *grammatical* note on ten chapters. A fierce light beats upon it. The student, reading that ἐκ τῆς δίκης means 'on account of his decision,' will think that it would be good Greek to write ἡράσθη τῆς γυναικὸς ἐκ τοῦ κάλλους, 'on account of her beauty.' If distinctions like those insisted on in this note and the last are to be neglected, then let us give up classics, and set about gaining a smattering of a dozen languages. Those who hold that such distinctions may be neglected may, no doubt, acquire a power of *using* a number of languages, but they will never *know* one.

III. 42. This is the famous relative τὰ. Mr. Mahaffy's only comment is 'from Mr. Verrall,' which is of course an abandonment of the defence. Mr. Sayce says he did not mean that τὰ stands for αὐτὰ. What did he mean? Why did he write 'τὰ for αὐτὰ'? And why did he translate τὰ by 'it'?

III. 52. Of course many *wrong* ways of translating the sentence are possible :

ἐσθλοὶ μὲν γὰρ ἀπλῶς, παντοδαπῶς δὲ κακοί.

III. 65. Possibly Mr. Sayce is right in here preferring

the interpretation 'without need.' Several of the editors prefer with me the meaning 'contrary to right.' The words οὐ δεῖ are most appropriate to *unnatural* crimes. Cp. Soph. O. T. 1184 :

φύς τ' ἀφ' ὧν οὐ χρῆν, ξὺν οἷς τ'
οὐ χρῆν ὁμιλῶν οὕς τέ μ' οὐκ ἔδει κτανῶν.

III. 82. 'From Mr. Verrall,' says Mr. Mahaffy, 'and moreover, as modified by Mr. Tyrrell, without any point.' Mr. Verrall merely mentions Mr. Sayce's translation without correcting it. I have corrected it; πολλοῖσι does *not* mean 'collectively'; it means 'in many cases': see my note. The case stands thus: Mr. Verrall merely indicated an error on the part of Mr. Sayce. I have pointed out the exact error and corrected it. How is my relation to the comment described? 'From Mr. Verrall, and moreover, as modified by Mr. Tyrrell, without any point.' Very possibly Mr. Mahaffy has not yet seen the point. I have made it clear to any unbiassed intelligence. Mr. Sayce's translation is quite indefensible.

III. 108. The first comment is accepted, the only attempted defence being 'from Mr. Verrall.' As to the second, Mr. Mahaffy says, 'I cannot find that this is a well-known Herodotean construction.' L. and S. on εἰμί, B. 2, have 'εἰσὶ ἐόντες, Hdt. III. 49; ἐστὶ τοῦσα, ib. 108.' Mr. Mahaffy displays a marked inaptitude to find facts which tell against him.

III. 108. Here is one of the passages where I claim to have thrown new light on the subject. Mr. Mahaffy often reproaches me for not doing so, when I had only to point out obvious errors, and no light could be thrown except such light as a school-boy would find superfluous. No scholar who reads my note will again explain ἀναίρειται as *conciipitur* without disproving the grammatical principle involved, or proving that ἀναίρειν = *conciipere*. A very

important grammatical principle is involved. Accordingly, Mr. Mahaffy naturally becomes playful. It is so funny that people should trouble themselves about such a thing as grammar. The principle involved in my note is that the passive must always be the passive of the active voice, and not of the middle; if αἶρω did not exist in the sense of 'I take,' ᾗρηται could not mean 'has been taken'; there could not exist in classical Greek ᾗσθηται = 'has been perceived,' because there is no αἰσθάνω. The middle, always taking in some reference to self, necessarily gives rise to a new notion; and the passive voice is not the passive of this new verb.

As to the ludicrous picture called up before Mr. Mahaffy's mind, is he ignorant that many if not most of the vocables in every language rest on a figurative basis which is afterwards quite lost sight of? If ἀναίρειν originally meant 'to take up, recognise,' it would soon come to indicate the immediate sequel of birth. Did the Romans think of straddling legs when they wrote *praevaricari*, and do we think of a threshing machine when we use the word *tribulation*? But the difficulty would hardly exist for the Greek, who in the largeness of his sympathies applied from the very first the language of human life to the lower animals. Hdt. II. 60, calls kittens the τέκνα of the cat; the cow in Homer is οὐ πρὶν εἰδυῖα τόκοιο (P 5), and the grubs of the wasp are τέκνα (M 107). Yet as regards the *feelings* of the Greeks, one would have thought Mr. Mahaffy would find himself on his strongest ground. I would now prefer to explain ἀναίρεται as middle = *concepit*: the subject is suddenly changed: τὸ is the accusative, and the nominative is λαγός. My former suggestion would imply a want of logical order in Hdt., which my present suggestion obviates. It seemed quite possible that Hdt. should violate the logical order in the sentence, but quite impossible that he should make ἀναίρειται the pas-

sive of ἀναίπειραι (middle); for ἀναίπει of course does not mean *conciptit*.

This is the last of Mr. Mahaffy's specific comments. I may add that the Society for the Prevention of Cruelty will never have to prosecute Mr. Mahaffy for 'riding a grammatical theory to death,' an act of inhumanity with which he charges me on this passage.

III. 125. Here Mr. Sayce reads in his text ἀποκτείνας . . . ἀνεσταύρωσε. In his note he says 'ἀποκ., &c., is epexegetical of ἀνεστ., and does not refer to a particular kind of death.' I pointed out (as also had Mr. Verrall) that ἀποκτείνας ἀνεσταύρωσε could not mean 'he killed by impaling.' Mr. Sayce's reply is, that he meant to print ἀποκτείνων in his text. And when Mr. Verrall and I assume that ἀποκ. in the note refers to ἀποκτείνας in the text, we are both rebuked for not inferring that ἀποκ. referred to ἀποκτείνων, existing only in the mind of Mr. Sayce. Let me tell him the meaning of οὐκ ἄξιως ἀπηγγήσιος, which he says he cannot understand. Hdt. means 'he slew him in a fashion not meet for me to describe (probably on account of its inhumanity), and then impaled his dead body.' The mode of death was *not* the impaling itself. This is Mr. Sayce's mistake. I did verify Mr. Sayce's note, but I cannot conceive how I could have arrived at the knowledge that when he printed ἀποκτείνας, the reading of all the editions, he meant to print ἀποκτείνων, a conjecture of his own, and a solitary conjecture. Besides, ἀποκτείνων ἀνεσταύρωσε could not possibly mean 'he killed by impaling.'

The rest of Mr. Sayce's Paper I will leave to Mr. Verrall. I repeat that if Mr. Sayce so often fails to interpret aright the text of Hdt.—where we think we can form a judgment about the character of his work—it seems not improbable that his interpretation of Hittite and Accadian inscriptions, and of the inscriptions which he has brought back from Smyrna, will often be wrong.

In answer to Mr. Mahaffy's summary of his position, I repeat that *ἐπεὶ γέ* means *ever since*, that is, *ἐπεὶ* means 'ever since,' as it very often does, and *γέ* has its usual force; and that *ἐκ τῆς δίκης* cannot mean 'on account of his decision'; I never said, or implied, that the word *ἄδραστος* cannot be used actively; and I repeat that *ἀναυπτεται* cannot mean *is conceived*, unless *ἀναυπῇ* means *conceives*, which it does not.

Messrs. Mahaffy and Sayce complain of my tone. Now I have observed that both these gentlemen are accustomed to deal pretty largely in a kind of criticism which seems to me not to be of the highest tone—the criticism which apparently regards *sic* as the Latin for *yah!*—and ekes out argument largely by typographical devices. Why, for instance, is the epithet 'venerable' used by me pilloried in a note of interjection by Mr. Sayce? And why does Mr. Mahaffy thus print a perfectly accurate statement on my part: '*ἐξελεῖν could not mean to choose!!*'? Mr. Sayce is remarkably free in the use of the interjection. I prefer to endeavour to say what I have to say in words.

As to Mr. Sayce's general argument, it seems to me to amount to this: If a writer puts forth an edition not *eo nomine* dealing with accident and syntax, he is justified in frequently making comments which conflict with, or ignore, accident and syntax. Mr. Mahaffy says, 'Mr. Sayce's reputation rests on other grounds than his knowledge of Greek syntax.' This is a reason why Mr. Sayce should write on those subjects on which his reputation rests; but it is no reason why he should be permitted to publish unchallenged erroneous views about Greek syntax.

Mr. Sayce, in a passage already quoted (on II. 129) makes himself liable to criticism on the grounds of grammar. He is therefore precluded from adopting the plea of his friends, that he is not a professed classical scholar, but an archæologist. I may also point out that to Mr.

Mahaffy cannot be extended the privileges of inaccuracy which are claimed for Assyriology and Egyptology, for he is not an Assyriologist or an Egyptologist or even a Crocodilologist. This being so, I think it is a pity that they should have opened a discussion by challenging the justice of my strictures.

If Mr. Sayce should reply to this Paper (which, I understand, he is to have an opportunity of doing), I hope he will answer the direct questions I have put to him. I do not intend to write again on this subject.

R. Y. TYRRELL.

A SUR-REJOINDER.

PROFESSOR TYRRELL'S rejoinder is such as to make a 'sur-rejoinder' a short and easy task. I can find little more in it than a reiteration of assertions that have already been answered—an attempt to escape from Professor Mahaffy's strictures by accusing the latter of ignorance of Greek grammar—an accusation which the world in general will not be inclined to endorse—and one or two fresh criticisms of the notes in my *Herodotos*, mixed up with much abuse of Professor Mahaffy and myself, reminding me of the famous advice given to the barrister who had no case. The whole is delivered in a tone of arrogance which claims for the author, and perhaps one or two Cambridge friends, 'an instinct for Greek,' denied not only to 'others entrusted with the business of education,' but even to Stein, who has made the language of Herodotos his life-long study.

Professor Tyrrell is evidently determined to apply to myself the verdict which I have passed on Herodotos, and which seems to have been at the bottom of all this raking up of side-issues that have nothing to do with the general aim and character of my book. I am not only untrustworthy, but unveracious. Time after time Professor Tyrrell recurs to his assumption that I supposed that *rá* 'could stand for *aurá*,' although I have told him that such an assumption is unfounded, and that my words mean nothing of the sort.¹ So, again, in spite of Preface and Reply, he

¹ I might retort on Professor Tyrrell the argument he advances on page 134: if he fails to interpret aright my English

text, it seems not impossible that his interpretation of Greek will often be wrong.

persists in regarding my edition of Herodotos as a grammatical commentary on the text, and as making me 'liable to criticism on the grounds of grammar.' Will he be convinced if I now, as a last resource, refer him to the notes themselves, in proof that the description I give of my own work is correct? If the notes were intended to be grammatical ones, would there, let me ask him, be only one 'grammatical note on ten chapters,' or would the translations, which he is so determined to regard as the enunciation of 'erroneous views about Greek syntax,' be given without any reference to Greek grammar, or any discussion of the opinions of other scholars? Is it probable that an editor who had before him the notes and translations of older commentators would deliberately reject them all, in order to put forward new and 'erroneous views about Greek syntax'? To quote Professor Tyrrell's words, for the purposes of my edition it was not necessary to 'know' the Greek language, but only to be able to 'use' it. I took it for granted that those who were 'acquainted with elementary Greek grammar and usage' would discover the literal rendering and construction of a passage as soon as its real sense was pointed out to them; at any rate there were plenty of commentaries from which they could discover this, and fair warning had been given them in my Preface that they were not to look for it in mine.

I notice that the word 'possible' plays a considerable part in Professor Tyrrell's defence. Considering the variety of interpretations that may be put upon sentences and phrases in all the languages with which I am acquainted, not excluding our own English, it seems to me that to speak of 'the only possible meaning' of a clause savours either of omniscience, or of ignorance of the real nature of language. Certainly he and I differ as to the meaning of the English I have written; while the translation proposed by him for ἀμφίς (i. 85.) is wrong, and

his etymological remarks are not happy (*e.g.* those on Adrasteia and Lykurgos²). No wonder, therefore, that he sneers at etymology.

Professor Tyrrell asks me to answer the direct questions he has put to me. But I fail to find any that have not been already answered, though I do find a good deal of abuse of Professor Mahaffy. He has, however, brought forward a few new points, which I will now proceed to notice:—

(1) First of all, he has discovered that *χωρία* (II. 25) does not mean the 'air,' but 'the country.' I should say that it means neither, but rather the 'regions,' a fact which I imagined everyone who could read Greek was acquainted with. I therefore did not think it necessary to explain that, in disagreement with older commentators, I considered the words of Herodotos in the passage under discussion to signify 'the upper regions' or 'parts of the air,' and not 'of the country.' I never supposed that my readers would be so dull of comprehension as not to perceive this.

(2) Because I asked why Professor Tyrrell considers my note on I. 155 to be 'astounding,' he concludes that Professor Mahaffy and I think '*κεφαλή* might signify *intelligence, reason*.' This is a curious *non sequitur*, far more 'astounding' than my note. I suppose that, if I tell him he has no eye for the facts of linguistic science, he will, by a parallel form of syllogism, accuse me of believing that "'eye" might signify *intelligence, reason*.'

² The second part of the name Lykurgos cannot be connected with *ἐργον* on account of the sense, or with *ἐργή* on account of the form, while the derivation of *λυκάβας* is very doubtful. Professor Tyrrell asks why he should have taken 'stems in *eos*' for a mis-

print? For the simple reason that there are no such stems, while the words quoted by me belong to stems in *-eu-s*. Professor Tyrrell goes on to cover his error (or inadvertence) by presuming to know better than myself what was in my MS.

(3) Professor Tyrrell is good enough to translate for me the passage about the impalement of Polykratês in III. 125. The translation is one with which I have been familiar since I first began to read Herodotos; but it is one which I cannot accept, because it makes no sense. Herodotos may have written many foolish things, but he could not have written anything so foolish as this. I maintain that my correction of the text is necessary for the sense, in spite of Professor Tyrrell's *dictum* that it 'could not possibly mean' what I say it does.

(4) It now appears that some of the errors with which I am charged are shared with commentators who have made the language of Herodotos their special study, and that in common with them I ought to have waited until Professor Tyrrell chose to enlighten us on the subject. I am quite content to be bracketed with Abicht and the condemned Stein.

(5) Professor Tyrrell accuses Professor Mahaffy and myself of eking out argument by 'typographical devices,' apparently because I placed a note of admiration after the epithet 'venerable,' which he has attached to the name of Herodotos. As he seems not to know why I have done so, I will tell him now. The object of my work was to compare Herodotos with the native monuments of those eastern lands about which the 'Father of History' writes, all of which were older than himself, some of them by two and three thousand years. Because I have shown that the result of the comparison is unfavourable to the Greek author, Professor Tyrrell accuses me of flouting a 'venerable' authority. Venerable, indeed; why he was but an upstart and a child by the side of those really venerable monuments which have risen out of the grave of centuries to convict him of error and untruth.

(6) Professor Tyrrell is still unwilling to receive any information which throws light on the meaning of Hero-

dotos, even where it may confirm the statements of the Greek writer. Thus even now he declares that *προσάγωγά* in II. 58 does not refer to litanies and hymns. It is of no use to argue further with one who refuses to learn.

Professor Tyrrell wisely refrains from attempting any reply to my answer to Mr. Verrall's criticisms. But I think that in common fairness he was bound either to do so, or to apologise for the emphatic way in which he endorsed them without taking the trouble to see what they were worth. Such hastiness, to give it no stronger name, makes one hesitate about accepting his judgment on other matters. And this hesitation is further justified partly by his supposition that he took my note on 'chariot' (not 'chariot with four-spoked wheels,' as he still seems to believe) 'in its natural sense,' partly by the carelessness, not to say recklessness, which makes him speak of my interpretation of 'Hittite' inscriptions, 'and of the inscriptions' I have 'brought back from Smyrna.' May I ask where they are to be found? The only inscriptions known to myself which I have brought back from Smyrna—apart from the copies of the Hittite hieroglyphics of Sipylos and Karabel—are Greek ones. As for the Hittite inscriptions, I only wish that I *could* interpret them.

I must leave Professor Mahaffy to answer the attacks made upon him, if he thinks it worth his while to do so after his return from Greece. His eminence, however, as a Greek scholar will relieve him from the necessity of noticing the uncourteous and inconclusive 'tu quoque' of his Dublin colleague.

A. H. SAYCE.

AESCHYLI AGAMEMNO, EMENDAVIT DAVID S.
MARGOLIOUTH, COLL. NOV. OXON. SOC.

A CURSORY glance at this edition of the 'Agamemnon' will clearly show that it has been produced with undue haste. Not only does it abound in misprints, careless accentuation, neglect of punctuation, and wrong references; but also many suggestions and changes have been introduced into the text as the emendations of the editor himself, though they have been proposed years ago. Most of these can be found in the well-known editions of Paley, Kennedy, and Davies.

After reading Mr. Margoliouth's criticism on Hermann's 'Aeschylus' (cf. 'Studia Scenica,' p. 31, note: 'Hermann's "Aeschylus" has always seemed to me one of the most over-rated books in the world'), we should not have been surprised had Mr. Margoliouth ignored every emendation or change in the text emanating from that illustrious scholar. Now, on the contrary, if we examine the present edition, we shall find that the editor reads in his text, and acknowledges as due to Hermann, no less than twenty emendations—surely no small number for one individual in a single play of Aeschylus—while at least five more emendations are read, and not acknowledged: cf. ll. 449, 478, 800, 1359, 1626.

In the 'Clavis Annotationis Criticæ' we read:—'*Intra lemmata scriptura est emendata cum nomine inventoris sui; cui nomen nullum appositum est scito editorem invenisse.*' The following list contains forty emendations, put

forward in the text by Mr. Margoliouth as his own, every one of which has been proposed or read by former editors :—

First comes Mr. Margoliouth's reading ; next the reading of the MSS. ; then the name of the editor to whom the emended reading is really due. When the name of the original emendator is recorded in a well-known edition, I add the name of the latter in a parenthesis.

- (1). 3, ἀνέκαθεν] ἄγκαθεν.—Franz (Paley, Davies).
- (2). 51, ἐπάνω] ὑπατοι.—Kennedy.
- (3). 79, θ' θ'] τίθ'.—Paley.
- (4). 135, στρατευθῆν] στρατωθῆν.—Schütz.
- (5). 141, λεπτοῖς] ἀέπτοισι.—Wellauer (Paley, &c.).
- (6). 170, οὐδ' ἐλέγξεται] οὐδὲν λέξει.—Kennedy.
- (7). 205, τόρ'] τόδ'.—Stanley (Davies).
- (8). 272, τί γὰρ τὸ πιστόν, 'adjecta post πιστόν nota ;
versui sensum dedi.'—Kennedy.
- (9). 431, δόμῳ 'ν] δόμων.—Halm (Davies).
- (10). 478, εἴ τι] ἦτοι.—Hermann.
- (11). 496, δς] ὤς.—Schütz.
- (12). 547, πόλει] στρατῷ.—Kennedy.
- (13). 572, ξυμφορὰς] ξυμφοραῖς.—Blomfield (Davies).
- (14). 597, καινοῦντες] κοιμῶντες.—Davies.
- (15). 606, εὐρεῖν] εὖροι.—Kennedy.
- (16). 612, χαλκός] χαλκοῦ.—Pauw (Schütz).
- (17). 657, κακῷ] κακοῦ.—Schütz.
- (18). 672, τί μὴν ;] τί μή ;—Linwood (Paley, &c.).
- (19). 696, κέλσαν τὰς] κέλσαντες.—Stanley (Schütz).
- (20). 697, ἐννοσιφύλλους] ἐπ' ἀξιφύλλους.—Schütz.
- (21). 725, σαίνοντα] σαίνων τε.—Auratus (Paley, &c.).
- (22). 772, εἰδομένας] εἰδομέναν.—Kennedy.
- (23). 800, οὐκ] οὐ γὰρ.—Hermann.
- (24). 822, ἀλλαγὰς] καὶ πάγας.—Ahrens (Davies).

- (25). 872, λαβεῖν] λαβών.—Kennedy.
 (26). 967, ὑπερτείνουσα] ὑπερτείνασα.—Auratus (Davies).
 (27). 969, σημαίνει μολόν] σημαίνεις μολών.—Voss (Davies).
 (28). 1046, ἡμῖν] ἡμῶν.—Paley.
 (29). 1094, ματεύειν] ματεύει.—Turnebus (Davies).
 (30). 1115, τόδ'] τί γ'.—Paley.
 (31). 1175, ὑπερθεν βαρὺς] ὑπερβαρής.—Paley.
 (32). 1199, παιώνιος] παιώνιον. — Codex Farnesianus (Paley, &c.).
 (33). 1228, οἷα] οἶα.—Madvig (Kennedy).
 (34). 1249, πω] πως.—Paley.
 (35). 1299, χρόνοι πλέω] χρόνῳ πλέω.—Davies.
 (36). 1359, πέρα] πέρι.—Hermann.
 (37). 1433, 'τ' post Ἀτην addidi.'—Kennedy.
 (38). 1454, ἀπέφθισεν] ἀπέφθισεν βίον.—Karsten (Davies).
 (39). 1505, 'σὺ addidi.'—Schütz.
 (40). 1626, αἰσχύνων] αἰσχύνουσ'.—Hermann (Davies).

To these I add three more which I have just noticed :—

- (41). 289, σκοποῖς] σκοπάς.—Blomfield (Hermann).
 (42). 449, διαὶ] διὰ.—Hermann (Davies).
 (43). 1625, μένων] νέον.—Wieseler (Davies).

On 119, 120, for λαγίαν ἐρικύματα φέρματα γένναν βλαβέντα κ.τ.λ., Mr. Margoliouth reads λαγίνας ἐρικύμονι φέρματι γέννας βλαβέντι. The reason for the several changes introduced into the text is explained by the note, 'sed quis βόσκομαι cum accus. conjunctum vidit?' We find no less than four instances of this construction in the *Hymn to Hermes*: ll. 27, 72, 232, 559. Cf. also Aristophanes, *Birds*, ll. 1099 and 1100.

Mr. Margoliouth's edition contains some two or three clever suggestions, the best of which probably are—'ῥίγος' for 'γῆρας,' at l. 1621; and 'παριέλς' for 'βαρελαίς,' at l. 1640.

It is remarkable that Mr. Margoliouth rejects some of the most certain emendations; *e. g.* Conington's ἀνπρέψειεν for ἀντρέψειεν, l. 1328; Davies' εὐκαλοι for εὐμορφοι, l. 454; and Davies' μονψδεῖ for ὑμνψδεῖ, l. 990.

Some of the worst misprints will be found at ll. 224, 284, 464, 537, 800.

For careless accentuation, cf. ll. 224, 361, 456, 823, 835, 1468, 1480.

For wrong references, cf. notes on ll. 50, 58, 276, 350, 1058.

JOHN SULLIVAN.

ON AN UNCIAL PALIMPSEST EVANGELISTARIUM.

THE MS. here described was included in the Sunderland Collection, recently dispersed by public auction. It has been purchased by the Trustees of the British Museum, and is now numbered in that library Addl. 31919. Dr. Scrivener designates it by the letter Υ (*Introduction*, 3rd ed., p. xiv).

A short time previous to the sale, the MS. was sent by the late Duke of Marlborough to Dublin, in order that Mr. Mahaffy and myself might have an opportunity of examining it, which we did, as far as the time at our disposal would permit.

In external form the volume is folio, the pages measuring $12\frac{1}{2}$ inches by $10\frac{1}{2}$. The later writing (dated 1431) consists of a Menaeum for the month of February, and is, generally, like the older, in double columns. Besides the Evangelistarium with which we are here concerned, there are other palimpsest fragments, including a patch from another Evangelistarium of like age and form, cursive fragments of St. Matthew's and St. Luke's Gospels, and pieces of ecclesiastical writing not biblical.

The columns of our Evangelistarium (Υ) are 10 inches in height and 3 in width; the form of the letters may be seen in the lithographed plate given herewith. It will be noticed that they are of the later elongated type, except in a few cases where the rounder form has been adopted for the sake of occupying space. In two or three instances

the letter B has the upper loop open, so as to be something between B and b. The initial letters of the paragraphs are large, outside the column; and the larger initials of the principal sections were originally in gold, of which but slight traces remain. The numbers and titles of the κεφάλαια are given, and the Ammonian sections, the latter being usually in red. They have sometimes been left without erasure, since occurring as they do between the columns they did not interfere with the later writing. The Eusebian canons are not found. There are traces of accents and breathings.

The MS. being exceedingly troublesome to read, we were unable from lack of time to collate it throughout, but we copied some entire pages, and part of others. The appended collation of these portions with Stephens' text (Scrivener's edition) will give some idea of the character of the text, which agrees very closely with the Codex Alexandrinus. St. Matt. v. 14 is preceded by the words ΕΙΠΕΝ Ο Κ^Θ ΤΟΙΣ ΕΑΥΤΟΥ ΜΑ, written originally in red and gold; and above the top of the column stands the heading ΕΙΣ ΙΕΡΑΡΧΑΣ, also in red and gold.

The following is a list of the contents of the fragments:—

		Folio.
Matth. i.	1-14,	105.
„ v.	3-19,	108.
„ xii.	27-41,	22.
„ xxiii.	9-xxv. 30,	{ 88, 74, 11, 43, 46, 16, 79, 95.
„ xxv.	43-xxvi. 26,	19, 36.
„ xxvi.	50-xxvii. 17,	38, 23, 20.
Mark i.	1-42,	18, 50, 52.
„ ii.	21-v. 1,	53, 55, 24, 67, 12, 17.

	Folio.
Mark v. 29-vi. 22,	10, 15, 70.
„ (vi. 14-20),	23 (patch).
„ x. 51-xi. 13,	104.
Luke xvi. 21-xvii. 3,	98.
„ xvii. 19-35,	21.
„ xix. 15-31,	101.
John ii. 18-iii. 5,	29.
„ iv. 23-37,	99.
„ v. 35-vi. 2,	100.

(67 and 88 were overlooked by us, and discovered by Dr. Caspar René Gregory).

On fol. 23 is the patch referred to above, containing Mark vi. 14-20, also in uncial characters. The ω in this patch is angular at the bottom; but an angular ω is also found on foll. 22, 104 and 108; also within a short distance of the round form on fol. 10. On 21, 29, and 101 occurs θ , with the cross line extended both ways (see Plate No. 3). It will be seen from the preceding Table that these folios belong to the same portion of the original MS. The form of M on 22 and 29 is also different from that on the other fragments. The folios on which the sections remain in red, imperfectly or not at all erased, are 108, 74, 11, 43, 46, 16, 19, 18, 17, 104, 21. Fol. 22 contains sections from which the colour is gone. Without further examination, I could not say with certainty how many of the remaining folios have contained the sections.

The specimens in the accompanying Plate are :—

1. Mark iv. 29.
2. Matth. xxvii. 4-6.
3. John ii. 22.
4. Heading of column, commencing with 5.
5. Prefixed to Matth. v. 14.

COLLATION OF Υ WITH THE TEXT OF STEPHENS.

S. MATTH.

Cap. xxv. 43 γυμνός—xxvi. 11 οὗ (*fol.* 19)

STEPH.	Υ.
44 αὐτῷ	om.
xxvi. 4 κρατήσωσι δόλω	δολω κρατησωσιν.

Cap. xxvii. 1 ἀρχιερεῖς—16 Βαραβ (*fol.* 20)

STEPH.	Υ.
7 δὲ	τε
12 Ἱερεμίου	ιερεμια.
15 ἵνα τῷ ὄχλῳ	τω οχλω ενα.

S. MARC.

Cap. i. 13 καὶ οἱ—43 ἐξέβαλεν (*fol.* 50, 52).

STEPH.	Υ.
14 τὸν Ἰωάννην	ιωαννην.
ib. ὁ Ἰησοῦς	ἰς
15 καὶ λέγων	λεγων.
16 αὐτοῦ	αυτου του σιμωνος.
ib. βάλλοντας ἀμφίβληστρον	αμφιβαλλοντας αμφιβληστρον.
37 ζητοῦσι σέ	σε ζητουσιν.

Cap. ii. 21 ἐπιγράφει—23 στάχυας (*fol.* 53 *recto*).

STEPH.	Υ.
ἐπιγράφει	επιραπτει.
22 οἶνον νέον	οινος νεος.

Cap. iv. 29 παραδῶ—33 κατασκηνοῦν (*fol. 17 recto*).

STEPH.

τ.

31 κόκκῳ

κοκκον.

ὅς

ὡς.

Cap. v. 29 ἔγνω—36 ἀκούσας (*fol. 10 recto*).

STEPH.

τ.

34 θυγάτηρ

θυγατηρ.

Cap. vi. 11 ὑμῶν—17 Ἰωάννην (*fol. 70 recto*).

No variation from Stephens.

T. K. ABBOTT.

DR. CASPAR GREGORY designates the Sunderland Palimpsest W^s (*Prolegomena to Tischendorf's Greek Testament*, 8th edit. p. 439).

ΠΑΡΑΨΩ¹ΚΑΣΠΟΣ
ΕΥΘΕΩΣ ΑΠΟΣΤΕΛ
ΛΕΙ ΤΟ ΔΡΕΠΑΝΟΝ· ΟΤΙ
ΠΑΡΕΣΤΗΚΕΝ Ο ΟΕ
ΡΙΣΜΟΣ

ΤΗ ΠΡΟΣΗΜΑΣ· ΕΝ ΟΨ
ΚΑΙ ΡΓ/ΑΣΤΑ ΔΡΤΥΡΙ
ΕΝ ΤΩ ΝΑΩ ΔΝΕΧ^ω
ΡΙΙΣΕΝ· ΚΑΙ ΑΠΕΛΘΟΥ
ΑΠΗΓΖΑΤΟ· ΟΙ Δ ΕΑΙ

3.
ΟΥΝΗΤΕΡΘΗΕΚ
ΝΕΚΡΩΝ ΕΜΙΠΙΣ
ΘΗΚΑΝΟΙΜΑΘΗ

4
ΕΙΣΙΕΡΑΧΕ

5.
 ΠΕΝΟΙΓΤΟΙΣ
ΕΑΥΤΟΝΜΑ

6
ΕΛΩΙ:ΝΙΜΑ ΕΑΒΑ
ΧΘΑΝΙ: Ο ΕΣΤΙΝ ΜΕ
ΘΕΙΜΗΝΕΥΟΜΕΝΟ:
ΟΘΕΜΟΝ ΟΘΕΛΙΟΝ.
ΕΙΣΤΙΜΕ ΕΤΙΣΑΤΕΛΕΙ

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ON A FRAGMENT OF AN UNCIAL LEC- TIONARY.

THE Ussher collection, in the Library of Trinity College, contains a Greek MS. of the Gospels in folio, known to biblical critics as 63. The first folio in this volume is palimpsest, and on the verso the later scribe has painted a portrait of S. Matthew.

This leaf originally formed part of a Lectionary, and appears to have been the outer sheet of a quaternion; but for the purposes of the later scribe it was unfolded, and mutilated. The writing is later uncial (ninth or tenth century), with accents and breathings, and is arranged in double columns. A specimen of the writing is given in the Plate (No. 6). The letter Δ, which does not occur in this extract, has the bottom line prolonged to the right, with a slight curve downward. Z has the middle stroke vertical, and extending below the line.

The portions of text are the following:—

First column, right-hand side	}	S. Mark, xv. 34-38.
of verso,		
Second (mutilated),	}	S. Luke, xxii. 66-70.
Third (mutilated), left hand		
of recto,		
Fourth,	}	S. John, xviii. 28-31.
Fifth,		
Sixth,	}	S. Luke, xxii. 66-70.
Seventh, left hand of verso,		
Eighth,	}	S. John, xviii. 28-31.

The matter missing between S. Luke xxiii. 2, and xxiii. 38 is just sufficient to fill eight columns or two leaves. The headings are lost, but there can be no doubt that these passages are part of the lessons for the eve of Good Friday. These lessons, according to the usage of the Greek Church, are thus given by Dr. Scrivener from several Evangelistaria (*Dict. of Christian Antiq.* s. v., *Lectionary*, p. 959 a, and *Introduction to Criticism of the New Test.*, 3rd ed., p. 83).

Hour (1) Matth. xxvii. 1-56.

„ (3) Mark xv. 1-41.

„ (6) Luke xxii. 66-xxiii. 49.

„ (9) John xix. 16-37.

It will be observed that the passage from S. Luke in our MS. (allowing for the missing portion) is identical with the lesson for the sixth hour; that from S. Mark is the latter part of the lesson for the third hour. But the passage from S. John begins earlier. Where it originally ended we cannot say, but it most probably continued to xix. 37. I am unable to throw any light on this peculiarity of the Lectionary of which this is a fragment. It is, however, worth noting that the lessons from the first three Evangelists, as above specified, all include the examination before Pilate; whereas that from S. John excludes this, which our MS. contains.

I append a collation of the fragment with the text of Stephens:—

	STEPH.	MS.
Mark xv. 34.	λαμμά.	λιμα.
	ἐγκατέλειπες.	εγκατελειπες.
35.	ἀκούσαντες.	om.

	STEPH.	MS.
Luke xxiii. 1.	ἐπί.	προς.
40.	εἰ.	εσμεν
45.	ἐννάτης.	ενατης.
46.	φωνήσας φωνῇ.	φωνη φωνη[σας] <i>ut vid.</i>

T. K. ABBOTT.

CHANCE AND LAW.

DOES the Calculus of Probabilities afford any argument against or for the existence of Chance in its old¹ sense of immunity from Scientific Law? I come to the same conclusion on this subject as Mr. Venn;² but in the course of the investigation I obtain views differing from his.

Probabilities, presenting a double aspect—knowledge of the average and ignorance of the particular—have seemed to countenance both parties to the Free-will controversy. The regularity of Statistics appears to Mill and Buckle to verify Determinism. What is random in the same class of phenomena appears to Renouvier to prove ‘libre arbitre.’ I maintain that there is something, although not so much as has been supposed, in the first contention; nothing in the second.

As to the views of Buckle, I quite agree with Mr. Venn:³ ‘It may be that knowledge is out of the question from the nature of the case, the causative link, so to say, being missing.’ . . . ‘although statistical uniformity and causation (in the sense of invariable sequence) are perfectly distinct things; and although it is difficult to show that they are so necessarily connected that the admission of the second must follow from the acceptance of

¹ Cp. Grote's *Aristotle*, vol. i. p. 165.

² *Logic of Chance*, pp. 237–241.

³ *Logic of Chance*, ch. ix. §§ 16–20.

the first, it is nevertheless true that they have some bearing upon one another. There can be little doubt, on the whole, that the statisticians have added force to the arguments which are commonly considered to disprove free will,' &c. I only attempt to supplement the pregnant words of Mr. Venn, by exhibiting the relation between the mathematical theory of the subject and the determinist doctrine. Suppose, that we have a set of perfect social statistics, such as, according to the just antithesis of Clerk Maxwell, were 'explained by Laplace and wondered at by Buckle.' Suppose that the aggregate of actions of a certain species obeys the law of Error. Then it is a fair presumption, from the mathematical analysis of that law, that the aggregate quantity, say E , may be regarded as the sum of a great many terms, such as $l_1 e_1 + l_2 e_2 + \&c.$; where $l_1, l_2, \&c.$, are constants, and $e_1, e_2, \&c.$, are quantities ranging each under a definite, though not in general a simple, law of facility. But the Calculus of Probabilities affords no proof that the elementary quantities $e_1, e_2, \&c.$, are predictable with regard to each particular event as well as the long run. It may be so; but it is also conceivable, and indeed seems to have been conceived by Quetelet, that these elements involve an arbitrary and unpredictable ingredient. It may be asked, whether the mathematical theory affords any evidence that the actions of each individual person are predictable, as regards the long run at least, obey a definite law of facility (in cases where this conception is appropriate: for instance, where the subject of the statistics is the quantity of liquor consumed; but otherwise in the case of suicides). This would occur if the actions of each individual corresponded to one of the

⁴ *Memoirs of the Astronomical Society*, vol. xl. p. 105. *Transactions of the Royal Society*, 1870, p. 177. *Phi-*

losophical Magazine, October, 1883, article on 'Law of Error'; and 1884, p. 138.

elements above symbolised, or even might be regarded as a definite function of those elements, *e.g.*,

$$E' = l'_1 e_1 + l'_2 e_2 + \&c.,$$

$$E'' = l''_1 e_1 + l''_2 e_2 + \&c.;$$

where $l'_1, l'_2, \&c., l''_1, \&c.$, are constants; the different values of E' represent the actions of a particular individual at different epochs, and similarly for E'' ; $E' + E'' + \&c. = E$. Again it is to be said that this may be so; but that it is possible to vary the hypothesis without affecting the given phenomenon, the regularity of E , which is to be accounted for. For instance, let $l'_1, l'_2, \&c., l''_1, \&c.$, from being constants, become variable in an arbitrary manner, subject only to the conditions that

$$l'_1 + l''_1 + \&c. = l_1; l'_2 + l''_2 + \&c. = l_2, \&c. = \&c.,$$

- and a certain other condition relative to mean squares of error. Then the actions of society would still be predictable as regards the long run, but the actions of the individual would not be predictable even in that degree; nevertheless, it may be admitted, that the phenomena of statistics afford some indirect verification of determinism, not only in the stricter sense of that doctrine (what I understand Mr. Venn to admit), but also in the partial sense above indicated.

Whatever the value of this verification, it is not impaired by Renouvier's arguments on the other side. The passages in his *Essais de Critique Générale* which relate⁵ to Probability may be read with great interest, as illustrating the possibility of there being in the nature of things an ingredient of lawlessness. But, when more than mere sufferance is claimed for this conception, Renouvier goes

⁵ See the Index at the end of vol. 3.

too far. His difficulty is to understand how the action of complex laws can result in that simple equality between alternatives which characterises Probabilities. He imagines an apparatus in which an endless procession of balls alternately black and white moves at a uniform rate under an aperture just large enough to allow one ball to escape. Whenever a certain spring is touched, the ball which is at the instant under the aperture is emitted. The spring is touched from time to time at random. The chances of white and black being emitted are then even. This result appears to Renouvier intelligible, on the hypothesis of an agent enjoying 'libre arbitre'; but otherwise not. He says: 'Il est impossible, ou singulièrement difficile, d'imaginer la suite des causes inconnues dont les effets observeraient la loi propre aux événements ambigus.' I submit that the difficulty is explicable by known or discoverable principles.

There is first the mathematical principle of Limit;* concerning which it is unnecessary to say anything here, except that the examples appropriate to our present subject are not those which come first to hand: where each step that we take brings us nearer to the limit. In statistics, the difference between the observed real and the ideal limiting ratio does not diminish with perfect regularity. It flickers and flares up as it dies out. Its alternation is not like the apparent convergence of the rails on a long straight railway. The comparison is rather with a river which, though it may occasionally expand into lakes, yet upon the whole narrows as we ascend towards its source. It is not the case of a simple pendulum sinking to rest according to a simple law; but rather of the arm of a very compound pendulum, the oscillation of which sinks

* There are some good remarks on this principle in De Morgan's *Calculus of Functions*, § 40.

and swells, it may be according to a not easily decipherable law, yet in the long run sinks.

In virtue of the principle of limit, it would be no matter of surprise that the superposition of complex laws should tend towards a simple result. But some larger principle is required, in order to explain why the result is not only simple but symmetrical, as it is in the example put by Renouvier and innumerable others, such as the throw of a perfectly symmetrical die or coin. Renouvier is right in desiderating some such axiom as the following: 'les causes variables des suites des événements d'un certain genre tendent à se balancer.' Such a principle, which I will not attempt to formulate precisely, might be rested upon Experience: Induction and Analogy, upon which⁷ Mr. Venn rests the proof of his 'series.' But this experiential basis must be made wider than Mr. Venn admits. It must cover not only experiments⁸ with coins and dice, but an indefinite number of instances in which the statistical ratio of real occurrences is what we conceive to be reasonable, what we find difficult to conceive other than it is. This class of things will best be indicated by means of some examples.⁹

Constants, and in general measurables, have in human experience as often one value as another. In each species of measurement prior to the observation, the operator has the knowledge that over a certain range of values one value occurs as often as another, in the long run of measurements of that species. This proposition is involved in the art of measurement known as the Method of Least Squares, and receives some support from its coherence with that vast mass of verified truth. Accordingly,

⁷ *Logic of Chance*, p. 77.

⁸ *Ibid.*, ch. iv.

⁹ The latter part of this Paper should

be read in connexion with the latter part of the Paper on the 'Philosophy of Chance', in *Mind*, April, 1884.

Donkin's¹⁰ doctrine of *a priori* probabilities may be more reasonable than the sceptical tone of Cournot and Mr. Venn. Cournot is always telling us that the 'subjective' probabilities, as he calls those now under consideration, are fit only to regulate the conditions of a bet. But he himself, in common with other mathematicians, employs this sort of probability when he comes to practice: in his ingenious reasonings concerning the distribution¹¹ of comets, and generally in the formulæ which determine¹² whether a certain discrepancy between two sets of statistics 'accuse' (in the French sense) a difference of causation.

Implicated with the preceding example is a second proposition both more distinct and better evidenced: namely, that in the long run of numbers which come under our notice one digit occurs as often as another. This proposition is not only agreeable to the general impression of persons conversant with the science of quantity; but also has been verified by the experiments of Mr. Proctor.¹³ The present writer has made some experiments of the same kind as his upon various tables and constants, with similar results. For example, in the development of π ,¹⁴ out of the first 600 digits there are 63 *ones*, 62 *twos*, and so on.

The preceding example may suggest that the evidence of propositions of the sort under consideration, although inductive, may be of that species of copious, intimate, almost unconscious, perhaps hereditary, induction on which some rest the axioms of mathematics. Accordingly it might well be that some would prefer to use the language of *a priori* in reference to the axioms of Proba-

¹⁰ *Phil. Mag.*, 1851, vol. i. p. 353 *et seq.*; p. 458 *et seq.*

¹¹ *Exposition de la Theorie des Chances.*

¹² *Ibid.*, chaps. vii. and viii.

¹³ *Universe and Coming Transits*, p. 100.

¹⁴ *Rectification of the Circle to 607 places*, by William Shanks.

bility; for instance, the Principle of Sufficient Reason in the sense in which it is applied by Donkin¹⁵ to Probabilities, a sense in which it may be largely applied in mathematics. Nor does there appear any objection to the use of such phrases as Donkin's 'sufficient reason,' or Laplace's 'number of favourable cases', provided it is admitted that they are but short titles of the voluminous records of experience; or at least, what the better class of *à priori*ists would admit, that general propositions cannot dispense with experience. Let it be granted to the inductive logician that our proposition about the equal distribution of digits must—equally with the proposition that space is homaloidal—be modified if it can be¹⁶ proved contrary to experience. Let it be granted that in the region of propositions which are¹⁷ on their way to the same order of evidence as mathematical axioms, there is a peculiar danger of the inexpert being led by the appearance of *à priori* knowledge¹⁸ into conflict with experience.¹⁹ Let it be granted that Induction is the only safe foundation upon which to build. I only contend that Mr. Venn, in common with Cournot and Ellis, has not made the foundation

¹⁵ *Phil. Mag.* 1851, vol. i. p. 355.

¹⁶ Upon the principles mentioned in *Mind*, 1884, p. 228, a moderate error would not make much difference in the case of most practical importance when the probabilities in question are *à priori* probabilities.

¹⁷ Mill's *Logic*, chaps. v. and vi.

¹⁸ The errors of genius will afford copious instances, as some of Descartes' speculations about motion, or Mr. Herbert Spencer's *à priori* reasoning that attraction between bodies must be in the ratio of the inverse square [*First Principles*, § 18].

¹⁹ The following problem bears some analogy with the difficulties which have

been raised about Inverse Probability. Let all sorts of constants be expressed in an arithmetic whose base is 2. And let us define the probability that, in taking a digit at random from the digits of any particular constant, the selected digit should be say 1, as the proportion between the *ones* and the *noughts* in the development of that constant. At first sight it might appear that, considering constants in general, the probability just defined would be equally likely to have one value as another. But reflection shows that in virtue of the general equal distribution of the digits 0 and 1, the probability $\frac{1}{2}$ is in a special degree likely.

wide enough, and that therefore he is unable to carry up the structure to the full height of generality. He is unable to rise to an axiom of equal distribution of quantities in general; above the view that,²⁰ 'in the absence of any such [specific] information, we are entirely in the dark. And the supposition made in § 12 [of a certain equal distribution of values] is neither more nor less trustworthy and reasonable than many others, though it doubtless possesses the merit of superior simplicity.'

Further illustrations of the species of probability under consideration are afforded by cases like Mill's, of a box²¹ containing balls of two colours; concerning which it is known that there are more balls of one colour than another, but it is not known which colour predominates; or the case put by Cournot, of a die known to be irregular (or not known to be regular), but concerning which it is not known which face (if any) is favoured by the irregularity. Cournot repeatedly points out that a case of this sort differs from that of the die proved to be regular, in this respect, that it would not be safe in the former case, as it would in the latter, to go on betting one to five on a particular face. But he omits to point out that in the long run, of all kinds of similar cases of perfect ignorance, if one went on making what may be called the normal bet (in Mill's case one to one, in Cournot's one to five), he would neither gain nor lose. No doubt, one might not be able to go on long enough; but it is equally true of the recognised species of chance that trials may not recur with sufficient frequency in our time to make it prudent for us to go on offering the normal odds: witness the Petersburg problem.²² I admit, however, that the circumstance insisted on by Cournot does constitute a certain difference between the two species

²⁰ *Logic of Chance*, p. 167.

dorcet on Petersburg problem, quoted

²¹ *Logic*, Book III., chap. xviii. § 2.

by Mr. Todhunter.

²² *Logic of Chance*, p. 20. Cf. Con-

of probability. But I submit that they are practically undistinguishable in one, and that the most important, case: namely, when they constitute *à priori* probabilities which are to be compounded with some *unnumerical* data in order to form *à posteriori* probabilities. For example, if we had to determine whether a black or white ball had been drawn from a box, given evidence²³ of various weights in favour of each alternative, it would not, I think, make much difference whether the *à priori* probabilities incidental to the problem were of the 'intellectual' sort, to use Boole's phrase, instanced just above in the example put by Mill, or of the more recognised sort which have been verified by specific experiment or deduction therefrom.

Another example of the probability which rests on an experience wider than experiments with dice or coins is the principle required by Boole's new method of Probabilities; that the probability of the concurrence of two events, concerning whose connexion or contrariety nothing whatsoever is known, is the product of the probabilities of each. This proposition is not only agreeable to our general impression about the course of things, but also may be verified by the following reasoning:—In the Laplace-Poisson proof of the Law of Error one condition is the *independence*²⁴ of the elementary laws of facility. Therefore, in so far as the Law of Error (or, as it may be added, something like it) does very generally occur in *rerum naturâ*, and is presumably²⁵ generated by a multi-

²³ I agree with Mr. Venn that numerical data for such problems are not generally attainable. But, if he infers that mathematical analysis is therefore inapplicable to such problems, I disagree with him [*Logic of Chance*, ch. xvi.].

²⁴ The exceptional case pointed out by Mr. Crofton, *Phil. Trans.* 1870, p. 183, note, may be regarded as a case of the failure of this condition.

²⁵ See note 4, *supra*.

plicity of elementary facility-laws, so far there is a presumption that independence of facility-laws does actually prevail.

I do not pretend to have penetrated to the common basis of all these examples. But, however superficially considered, they may suffice to exhibit the possibility of a connexion between the appearance of lawless chance and the reality of scientific law. If, for example, in Renouvier's²⁶ apparatus the stream of balls moved at the rate of a diameter per second, then almost any law taken at random (if the expression be allowed) would give as many odd as even values for the time, as many black as white balls in the long run. For instance, in each successive decade of seconds, let the second at which the spring is touched be given by the successive digits of the constant π .²⁷ And yet each digit is determined by a strict law. We find, then, that Renouvier's conclusion is unsound, though his premisses are interesting and suggestive. We find that on the purely philosophical question presented by our title, Mr. Venn is a safe guide; but that on the axioms of Probabilities which the inquiry has brought under our notice, the mathematical founders of the science are better authorities than the acute logician who has attempted to undermine their work.

F. Y. EDGEWORTH.

²⁶ Above, p. 157.

²⁷ Above, p. 159.

ON TWISTED QUARTICS.

A TWISTED algebraic curve is the complete or partial intersection of two algebraic surfaces, and its degree is defined to be the number of points in which it meets any arbitrary plane.

It is easy to see that such curves of any degree higher than the second can be traced on a quadric surface, and it is also obvious that there are many such curves which do not lie on any quadric; and further, that both those which lie on quadrics, and those which are the complete intersections of algebraic surfaces of any degree, will intersect any other surface in a number of points equal in each case to the product of the degrees of the curve and surface. It is generally assumed that this property is true of all algebraic curves, but I am not aware that it has been proved except in special cases, such as those above mentioned.

The object of the present investigation is to show that the classification of twisted quartics, which is founded on this property, includes all possible twisted quartics; and thus indirectly to show that the property is true of all these curves; or, in other words, that if a twisted curve meets every plane in four points, it will meet every surface of the n^{th} degree in $4n$ points.

Now it follows from the definition that if a cone stands on a twisted quartic, and if its vertex is on the curve, the cone cannot be of a degree higher than the third, since a plane passing through the vertex cannot meet the curve in more than three other points.

Let x then be an inflexional tangent plane to any such cone; let y be one of the three tangent planes which pass through the line of inflexion, and let z be the corresponding harmonic polar; the equation of the cone will be

$$\alpha y^3 + \beta xy^2 + \gamma x^2y + \delta xz^2 = 0. \quad (1)$$

Also, if ω be the plane which contains the tangent to the curve at the point where it meets the line of inflexion xy , and which also passes through the point where the curve meets yz ; the equation of a second cone, standing on the quartic and having its vertex at ωxy , will be

$$(Ay + B\omega)x^2 + (Cy^2 + Hy\omega + D\omega^2)x + (Fy + G\omega)\omega y = 0; \quad (2)$$

and a third cone, standing on the same quartic and having its vertex at ωyz , will touch ω along the line ωy , and its equation will be of the form

$$\alpha y^3 + b\omega y^2 + c\omega^2y + (fy^2 + h\omega y + g\omega^2)z + d\omega z^2 = 0. \quad (3)$$

If, therefore, the curve be a quartic, these three cones must have a common intersection, and the equation which results from eliminating x between (1) and (2) will have (3) for a factor: that is to say—

$$\begin{aligned} & a(aA^3 - \beta AC + \gamma C^2)y^3 + \{2a^2AB + 2a\gamma(CH - AF) \\ & \quad - a\beta(AH + BC) - \beta\gamma CF + \beta^2AF\}\omega y^2 \\ & + \{a^2B^2 + a\gamma(H^2 - 2AG - 2BF + 2CD) - a\beta(AD + BH) \\ & \quad + \gamma^2F^2 - \beta\gamma(CG + FH) + \beta^2(AG + BF)\}\omega^2y \\ & + \{2\gamma^2FG - \beta\gamma(DF + GH) + 2a\gamma(DH - BG) + \beta^2BG \\ & \quad - a\beta BD\}\omega^3y^2 + \gamma(aD^2 - \beta DG + \gamma G^2)\omega^4y^2 \\ & - a\delta ACy^3z^2 + \delta\{2\beta AF - a(AH + BC) - \gamma CF\}\omega y^2z^2 \\ & + \delta\{2\beta(AG + BF) - a(AD + BH) - \gamma(CG + FH)\}\omega^2y^2z^2 \end{aligned}$$

$$\begin{aligned}
& + \delta \{ 2\beta BG - aBD - \gamma(DF + GH) \} \omega^3 y^2 z^2 - \gamma \delta DG \omega^4 y z^2 \\
& + \delta^2 AF \omega y^2 z^4 + \delta^2 (AG + BF) \omega^2 y z^4 + \delta^2 BG \omega^3 z^4 \\
& = \{ a\delta \frac{AC}{f^2} y + \delta^2 \frac{BG}{d^2} \omega \} \{ (ay^3 + b\omega y^2 + c\omega^2 y + d\omega z^2)^2 \\
& \quad - (fy^2 + h\omega y + g\omega^2)^2 z^2 \}
\end{aligned}$$

(The form of the second member of this equation follows from the condition that it contains z only in the second and fourth degrees.)

Hence, by comparing the terms $\omega^5 z^2$ and $\omega y^2 z^4$, we find $AF = 0$, $BG = 0$; therefore there are only four possible cases—

- (1) $F = 0$, $G = 0$; (2) $A = 0$, $B = 0$;
 (3) $B = 0$, $F = 0$; (4) $A = 0$, $G = 0$.

In the first case the coefficients of $y\omega^4 z^2$ and $y\omega^2 z^4$ vanish; therefore, either $a = 0$, or $d = 0$, $g = 0$, and two of the given equations will represent quadric cones, whose intersection is a well-known twisted quartic (the irrelevant solutions $x = 0$, $y = 0$, being omitted).

In the second case the result of elimination is divisible by γy , and the terms which contain z^4 will vanish; so that we have

$$\begin{aligned}
& aC^2 y^6 + \{ 2aH - \beta F \} C\omega y^5 + \{ a(H^2 + 2CD) - \beta(CG + FH) \\
& \quad + \gamma F^2 \} \omega^2 y^4 + \{ 2aDH - \beta(DF + GH) + 2\gamma FG \} \omega^3 y^3 \\
& + (aD^2 - \beta DG + \gamma G^2) \omega^4 y^2 - \delta CF \omega y^3 z^2 - \delta(CG + FH) \omega^2 y^2 z^2 \\
& \quad - \delta(DF + GH) \omega^3 y z^2 - \delta DG \omega^4 z^2 \\
& = a \frac{C^2}{a^2} \{ (ay^2 + b\omega y + c\omega^2)^2 y^2 - (fy^2 + h\omega y + g\omega^2)^2 z^2 \};
\end{aligned}$$

and, comparing the terms $y^4 z^2$, and $\omega y^2 z^4$, we find $f = 0$,

$\delta CF = 0$; and, omitting the case $\delta = 0$ (which would give plane curves), we have either $C = 0$ (and therefore $a = 0$), or $F = 0$; that is to say, either the equations (2) and (3) represent quadric cones, or else the last written equation is reduced to

$$\begin{aligned} & aC^2y^3 + 2aCH\omega y^3 + (aH^3 + 2aCD - \beta CG)\omega^2y^4 \\ & + (2aD - \beta G)H\omega^3y^3 + (aD^3 - \beta DG + \gamma G^2)\omega^4y^2 \\ & - \delta G\omega^2z^2(Cy^3 + H\omega y + D\omega^3) \\ & = a \frac{C^3}{a^2} \{(ay^3 + b\omega y + c\omega^3)^2y^2 - (hy + g\omega)^2\omega^2z^2\}; \end{aligned}$$

whence

$$aH = bC, \quad h^3D = g^3C, \quad \delta a^2G = ah^2C, \quad bh = 2ag, \quad \beta^2 = 4a\gamma;$$

and equations (1) and (2) become

$$(\beta x + 2ay)^2y + 4a\delta z^2x = 0, \quad \frac{\delta}{a} \frac{h^4}{a^2} \omega^2y + (hy + g\omega)^2x = 0;$$

therefore,

$$(\beta x + 2ay)(hy + g\omega) = \pm 2\delta \frac{h^2}{a} \omega z;$$

and the quartic is one of the second kind, being the intersection of this quadric with a cubic cone, having the double edge xy .

In the third case the result of elimination may be written

$$\begin{aligned} & AG\omega^2(\beta y^3 + \delta z^3)^2 - (aAy^2 + \gamma G\omega^2)(\beta y^2 + \delta z^2)(Cy^2 + H\omega y + D\omega^2) \\ & + a\gamma y^2(Cy^2 + H\omega y + D\omega^2)^2 + y^2(aAy^2 - \gamma G\omega^2)^2 = 0; \end{aligned}$$

and the coefficients of equation (3) will be

$$a = \sqrt{a(A^2 - \beta AC + \gamma C^2)},$$

$$b = \frac{AH}{C} (2\gamma C - \beta G) \sqrt{\frac{a}{aA^2 - \beta AC + \gamma C^2}},$$

$$c = \sqrt{\gamma(aD^2 - \beta DG + \gamma G^2)}, \quad f = \sqrt{a\delta AC},$$

$$h = \frac{H}{2C} \sqrt{a\delta AC}, \quad g = \sqrt{\gamma\delta DG};$$

and comparing coefficients, we find

$$A = \sqrt{\gamma}, \quad C = \sqrt{a}, \quad H = 2\sqrt{CD} + 2\sqrt{AG}, \quad \beta^2 = 4a\gamma,$$

and equations (1) and (2) become

$$(\beta x + 2a\gamma)^2 y + 4a\delta z^2 x = 0,$$

$$(\sqrt{A} \cdot x + \sqrt{G} \cdot \omega)^2 y + (\sqrt{C} \cdot y + \sqrt{D} \cdot \omega)^2 x = 0;$$

therefore the quartic will be of the second kind, being the intersection of the quadric

$$(\beta x + 2a\gamma)(\sqrt{C} \cdot y + \sqrt{D} \cdot \omega) = 2\sqrt{a\delta} \cdot z(\sqrt{A} \cdot x + \sqrt{G} \cdot \omega),$$

with a cubic cone, having the double edge xy .

In the fourth case a comparison of the coefficients will show that

$$f = 0, \quad g = 0, \quad h = 0, \quad aD = cC, \quad aB = \gamma F,$$

and the equations become

$$ay^3 + \beta xy^2 + \gamma x^2 y + \delta xz^2 = 0; \quad (1)$$

$$\gamma d\omega x^2 - (\delta ay^2 + \delta b - \beta d\omega y + \delta c\omega^2)x + ad\omega y^2 = 0; \quad (2)$$

$$ay^3 + b\omega y^2 + c\omega^2 y + d\omega z^2 = 0, \quad (3)$$

and the result of eliminating x between (1) and (2) is the

square of (3); so that each of the three cones contains the entire curve, and it does not yet appear whether it can be resolved into quartics. In like manner, if the vertex of the cone be uvz , where the curve meets the plane z , and where

$$u = \gamma x + \epsilon y, v = c\omega + ey, 2\epsilon = \beta \pm \sqrt{\beta^2 - 4a\gamma}, 2e = b \pm \sqrt{b^2 - 4ac},$$

the equation will be

$$\begin{aligned} & u^2 v^2 \{d(b - 2e)u^2 + (d \overline{2\epsilon} - \beta + \delta \overline{2e} - b)uv + \delta(\beta - 2\epsilon)v^2\} \\ & + uvz^2 \{(\delta d e \overline{b - 2e} + \overline{\beta - 2\epsilon} d^2 e)u^2 \\ & + [(\delta \overline{2e} - b + \overline{\beta - 2\epsilon} d)^2 + 2\delta(\overline{2\epsilon} - \beta d e + \epsilon d \overline{2e} - f)]uv \\ & + \delta\epsilon(\delta \overline{b - 2e} + \overline{\beta - 2\epsilon} d)v^2\} + \delta d z^4 \{(\beta - 2\epsilon)d e^2 u^2 \\ & + (\epsilon \cdot \overline{2\epsilon} - \beta d e + \delta \epsilon \overline{2e} - b e)uv + \delta \epsilon^2 (b - 2e)v^2\} = 0, \end{aligned}$$

and this may be resolved into factors, if

$$(\beta - 2\epsilon)d = \delta(b - 2e);$$

that is to say, if

$$(\beta^2 - 4a\gamma)d^2 = \delta^2(b^2 - 4ac),$$

in which case it becomes

$$\begin{aligned} & \{uv(du - \delta v) + \delta d z^2(\epsilon u - \epsilon v)\} \{uv(\overline{b - 2e} u + \overline{2\epsilon - \beta} v) \\ & + z^2(\overline{\beta - 2\epsilon} d e u + \delta \epsilon \overline{2e - b} v)\} = 0; \end{aligned}$$

but by the previous condition these two factors are identical, and the curve remains undivided. Again, if we take any arbitrary point on the curve as vertex, a further condition of the equation being resolved into factors will be found to be $\beta d = \delta b$, in which case the two factors will still be identical, so that in no case do the cones intersect on a

second quartic ; but when both of these conditions are fulfilled, we may multiply the first equation by a and the third by α , and divide the difference by $\delta ax - \alpha d\omega$, and the quotient will be

$$\beta dy^2 + \gamma dxy + \delta c\omega y + \delta dz^2 = 0 ;$$

also the first member of equation (2) is

$$\frac{(\delta ax - \alpha d\omega)(\gamma d\omega x - \delta ay^2)}{\delta \alpha} ;$$

therefore, omitting the sections in the plane $\delta ax = \alpha d\omega$, the remaining intersection will be the quartic of the first kind determined by the intersection of the quadrics

$$\beta dy^2 + \gamma dxy + \delta c\omega y + \delta dz^2 = 0, \quad \gamma d\omega x - \delta ay^2 = 0.$$

Hence we see that, in general, when $G = 0$ the quartic is of the first kind, and that $B = 0$ is the condition of its being of the second kind.

ANDREW S. HART.

REVIEW OF THE MATHEMATICAL PAPERS OF THE LATE MR. MICHAEL ROBERTS.

MR. ROBERTS was the eldest son of Michael Roberts, Esq., of Kilmoney Abbey, near Carrigaline, in the county of Cork. He and his twin brother, Mr. William Roberts, were born at Kilmoney, on the 10th of May, 1817. The brothers were educated at Midleton School, and entered Trinity College in the year 1833.

Mr. Roberts obtained classical Scholarship in 1836; he graduated B.A. in 1838, and was elected Fellow in 1843.

In 1862 Mr. Roberts was appointed to the Professorship of Mathematics, which post he held for seventeen years.

Trained under MacCullagh, whose power of investing his subject with interest and giving elegance to his mathematical demonstrations rendered him eminently successful as a teacher, Mr. Roberts was strongly impressed with the advantages a class derives from a careful instructor.

As Professor of Mathematics, his lectures were addressed to the Moderatorship and Fellowship Candidates, and were prepared with the greatest care, and always contained valuable and instructive matter. For many years before his appointment he had studied the Theory of Invariants and Covariants, and had published several valuable Papers on these subjects, which formed the basis of his earlier lectures.

The subject of Hyper-Elliptic Integrals which, since the publication of Jacobi's Papers, had been largely developed by Riemann, Weierstrass, and other mathematicians, next claimed his attention. In 1871 he published

his *Tract on the Addition of Elliptic and Hyper-Elliptic Integrals*, which, with some additions and alterations, consists of a collection of the matter treated of in his lectures on this subject.

In 1879 Mr. Roberts was co-opted a Senior Fellow, and vacated, consequently, the Professorship of Mathematics.

Mr. Roberts died October 4th, 1882, having been for some years in failing health.

A great impulse was given to the study of lines traced on the surface of the ellipsoid by Jacobi's discovery of the complete integral of the differential equation of the geodesic lines on that surface. This remarkable result was first published, without proof, in Crelle's Journal in 1839.

Other geometers, and in particular Liouville, have given, under different forms, the details of the demonstration which Jacobi had suppressed.

From Liouville's form of the differential equation of geodesic lines, viz.,

$$\mu^2 \cos^2 \iota + \nu^2 \sin^2 \iota = \beta,$$

Mr. Roberts derived his celebrated theorems of geodesics and lines of curvature on an ellipsoid. He showed that geodesic lines which issue, in all directions, from an umbilic of the surface pass through the opposite umbilic, where they meet with equal lengths.

Again, that the lines of curvature, considered with respect to two interior umbilics, taken as foci, offer the most striking analogy to the ordinary ellipse, and can be described, like it, by means of a thread attached by its extremities to these fixed points.

It follows that the sum of the geodesic arcs drawn from

the foci remains constant when the point moves on the line of curvature to which it belongs.

The same analogy with the hyperbola is found in taking as foci an interior and an exterior umbilic.

The demonstrations of these theorems, which were communicated to the *Journal de Mathématiques* in the year 1845, depend upon the facts that, in Liouville's equation, β preserves the same value for every geodesic line which passes through an umbilic of the surface, and also that, for a given value of β , $\tan^2 i$ has but one value; consequently, two geodesic lines which correspond to one and the same value of β make equal angles with a line of curvature.

From the above facts it was also shown to follow that if two geodesic lines are tangents to two given lines of curvature, and cut at a right angle, the locus of their intersection is a sphero-conic.

The simple and beautiful method of description of the lines of curvature exposed in this communication, once known, it was not difficult to find properties of geodesics and lines of curvature analogous to many of the known properties of plane confocal ellipses. Thus, for instance, the analogue of Dr. Graves's theorem, which Mr. Roberts appears not to have noticed, was immediately pointed out by Chasles.

In a letter addressed to Liouville in 1846, Mr. Roberts points out several theorems of importance which resulted as easy consequences from his foregoing results:—

‘The geodesic triangle, whose angular points are the contiguous umbilics, situated at opposite sides of the least axis, and any point of the section containing the greatest and mean axes, will have the sum of its base angles equal to two right angles.’

‘The sum of its sides will be the semi-circumference of the principal section perpendicular to the mean axis.’

‘If from an umbilic a geodesic line be drawn which

forms a right angle with the section of the surface passing through the umbilics, this geodesic will pass through the mean axis of the surface.'

In a memoir which was published in the *Journal de Mathématiques* in 1848, Mr. Roberts treats of the form of the equation of geodesic lines which pass through an umbilic of the surface, and also of an expression for the element of an arc perpendicular to an umbilicar geodesic.

The principal results arrived at consist in the form into which he had thrown the second integral of the equation of a geodesic which passes through an umbilic, in expressing the arbitrary constant as a function of the angle the geodesic makes with the principal section of the surface containing the umbilics.

If O and O' are the two interior foci of the lines of curvature represented by the equation $\mu = \text{constant}$, P any point on the surface, the equations of OP and $O'P$ can be written—

$$\int_0^\mu \frac{\sqrt{a^2 - \mu^2}}{\sqrt{k^2 - \mu^2}} \cdot \frac{d\mu}{\mu^2 - h^2} + \int_0^v \frac{\sqrt{a^2 - v^2}}{\sqrt{k^2 - v^2}} \frac{dv}{h^2 - v^2} = \frac{1}{h} \sqrt{\frac{a^2 - h^2}{k^2 - h^2}} \cdot \log \tan \frac{1}{2}\omega,$$

$$\int_0^\mu \frac{\sqrt{a^2 - \mu^2}}{\sqrt{k^2 - \mu^2}} \cdot \frac{d\mu}{\mu^2 - h^2} - \int_0^v \frac{\sqrt{a^2 - v^2}}{\sqrt{k^2 - v^2}} \frac{dv}{h^2 - v^2} = \frac{1}{h} \sqrt{\frac{a^2 - h^2}{k^2 - h^2}} \cdot \log \tan \frac{1}{2}\omega.$$

From these equations Mr. Roberts derives numerous theorems, the most remarkable of which are the following:—

'If O and O' are the above-mentioned umbilics, and P a point on the line of curvature $\mu = \text{constant}$: then

$$\tan \frac{1}{2} POO' \tan \frac{1}{2} PO'O = \text{constant}.'$$

'If a geodesic line pass through an umbilic, and meet a given line of curvature (μ) in two points P, P' ; then $\tan \frac{1}{2} PO'O \tan \frac{1}{2} P'O'O = \text{constant}.'$

'If through a point P two geodesic lines be drawn,

passing through the umbilics O and O' , and meeting a given line of curvature in points Q, Q', R, R' , respectively, then the intersection S of the geodesics $OQ, O'Q$, and S' of $OR', O'R$, will describe lines of curvature of the same kind.'

Again, if a point P taken on a line of curvature be joined by geodesics to the umbilics O and O' , and these geodesics meet the line of curvature again in Q, Q' , the geodesics $OQ, O'Q$ meet in a point lying on a line of curvature of the same kind as the first; the geodesics $OQ', O'Q$ meet the first line of curvature in R and R' , the jointing lines $OR', O'R$ meeting in a point lying on another line of curvature of the same kind. As this construction can be continued *ad infinitum*, from a given line of curvature an infinite series of lines of curvature of the same kind can be derived. If the constants of these lines be denoted by $\mu, \mu_1, \mu_2, \dots, \mu_n$, it is found that

$$\int_k^{\mu_n} \sqrt{\frac{a^2 - \mu^2}{k^2 - \mu^2}} \cdot \frac{\widetilde{a}_\mu}{\mu^2 - h^2} = (2n + 1) \int_k^\mu \sqrt{\frac{a^2 - \mu^2}{k^2 - \mu^2}} \cdot \frac{d\mu}{\mu^2 - h^2}.$$

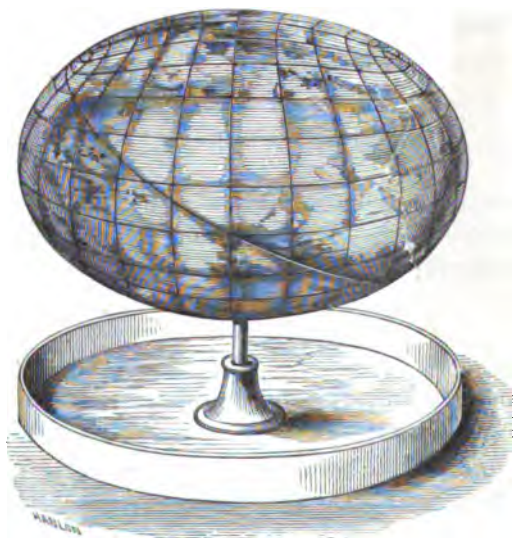
This equation is remarkable, as it furnishes a geometrical construction for the multiplication by an uneven number of the integral—

$$\int \sqrt{\frac{a^2 - \mu^2}{k^2 - \mu^2}} \cdot \frac{d\mu}{\mu^2 - h^2}.$$

Mr. Roberts then treats of the element of an arc perpendicular to an umbilicar geodesic; and, if the element be denoted by $Pd\omega$, ω being the angle the geodesic forms with the principal section containing the umbilics, proves that P is equal to $\frac{\gamma}{\sin \omega}$. From this expression Mr. Roberts had, in an article published in the *Cambridge and Dublin Mathematical Journal* in 1848, already deduced some of the above theorems. The function P is of importance in the

theory of curves traced on the surface of the ellipsoid, and possesses many curious properties. Again, it may be noticed that in the analytical expression for P we light on the remarkable functions Θ , H , which are of such importance in the theory of elliptic integrals.

When Mr. and Mrs. Roberts were visiting the International Exhibition of 1851 at Hyde Park, Mrs. Roberts' attention was attracted by seeing the name of Michael Roberts attached to a small model, which proved to be that of an ellipsoid which had been made in Berlin, and on which were traced the lines of curvature by means of Mr. Roberts' method of description. Mr. Roberts subsequently obtained possession of the model, which is represented in the accompanying woodcut :—



Of Mr. Roberts' earlier theorems on lines of curvature and geodesics, in connexion with Jacobi's integral, Liouville writes in the following words :—' Mais c'est M. Michael

Roberts qui a véritablement donné une forte impulsion à la recherche des conséquences géométriques auxquelles cette intégrale conduit. Les beaux théorèmes qu'il a publiés ont été reçus avec des applaudissements unanimes, et en appelant sur ce sujet important l'attention des géomètres, ils ont amené beaucoup d'autres découvertes du même genre: il est juste sans doute de reporter sur M. Roberts une partie de l'honneur même qu'ont pu ainsi acquérir des savants auxquels il avait donné l'exemple.'

In a Paper published in the *Nouvelles Annales de Mathématiques* in 1855, Mr. Roberts gives a new form of the equation of a geodesic on the surface of an ellipsoid, differing from that given by Joachimsthal, and presenting a remarkable analogy with the equation of geodesic lines on a conical surface.

Mr. Roberts considers the differential equation of the cuspidal edge of a developable circumscribed to a surface of the second order, and supposes this cuspidal edge to lie on a second surface confocal with the first. But the two confocal surfaces can be considered as two nappes of a surface, the locus of the centres of curvature of another surface; consequently the equation of the cuspidal edge will be the equation of a geodesic line on the second surface confocal with the first.

This remarkable relation which exists between two confocal surfaces of the second degree clearly shows the origin of the beautiful property discovered by Chasles—that all the tangents to a geodesic line upon a surface of the second order are tangents to a second surface confocal to the first.

An interesting discussion of the lines of curvature and asymptotic lines on the surface which possesses the property, that at every point the sum of the principal curvatures is zero, is given by Mr. Roberts in an article published in the *Journal de Mathématiques*. The above

property leads, as is well known, to a partial differential equation of the second order—an equation which was first integrated by the celebrated Monge, who expressed the co-ordinates of a point on such a surface in terms of two parameters, the expressions involving two arbitrary functions of these parameters. Any relation between these two parameters will determine a curve on the surface; and the determination of the lines of curvature on the surface leads to a differential equation connecting these parameters. This equation Mr. Roberts has completely integrated.

About the middle of the present century the attention of mathematicians was directed to the Theory of Linear Transformations as applied to binary quantics. The property of invariance was shown to belong to discriminants by Boole, in a Paper published in the *Cambridge Mathematical Journal* for 1841. Boole's Paper led to Cayley's investigation of those functions of the coefficients of an equation which possess this property of invariance; and he found that it was not peculiar to discriminants, and showed that there were other functions of the coefficients also possessing this property.

Space will not permit me to enter into any detailed account of the progress of the Modern Higher Algebra, which in itself would furnish ample materials for an interesting Paper, and I can but briefly indicate Mr. Roberts' additions to our knowledge of that subject.

In the *Nouvelles Annales de Mathématiques* of 1857, Mr. Roberts treats of an equation connected with two biquadratic equations in the following manner:—If the roots of the first equation be $\alpha, \beta, \gamma, \delta$, and the roots of the second $\alpha', \beta', \gamma', \delta'$, Mr. Roberts forms the equation whose roots are $\alpha\alpha' + \beta\beta' + \gamma\gamma' + \delta\delta'$. It is easily shown that this equation is of the twenty-fourth degree; but by making use of the algebraic solutions of the given equa-

tions, Mr. Roberts succeeded in throwing it into a simple form leading to many different results, the most important of which is the equation of the squares of the differences of the roots of a biquadratic; an equation which had not been given before.

Considering in general the equation of the squares of the differences of the roots of an equation of the n^{th} degree, viz.:

$$(a, b, c, d, \dots)(x, y)^n = 0,$$

and calling s_0, s_1, s_2, \dots the sums of the zero, first and second powers of the roots, he shows that the sum of the p^{th} powers of the roots of the equation whose roots are the squares of the differences of the roots of the first-mentioned equation is the quadratic invariant of the form

$$(s_0, s_1, s_2, \dots s_{2p})(x, y)^{2p}.$$

This theorem Mr. Roberts demonstrates in the same journal, and applies it to calculate symmetric functions of the form $\Sigma(x_i - x_j)^{2p}$ for the values of p , equal to 1, 2, 3 and 4, respectively.

In an article published in the *Quarterly Journal of Mathematics* for the year 1861, Mr. Roberts considers the symmetric function

$$\frac{\Sigma \phi(x_1) f'(x_2) f'(x_3) \dots f'(x_n)}{f'(x_1)};$$

where $x_1, x_2, \dots x_n$ are the roots of the equation

$$(a_0, a_1, a_2 \dots a_n)(x, 1)^n = 0,$$

and $\phi(x_1)$ a rational and integral function of x_1 ; and shows that to obtain the value of this function in terms of the

coefficients $a_0, a_1, \dots a_n$, it is only requisite to know that of the following determinant

$$\begin{vmatrix} s_0 & s_1 & \dots & s_{n-2} \\ s_1 & s_2 & & s_{n-1} \\ s_{n-2} & s_{n-1} & & s_{2n-4} \end{vmatrix},$$

where s_0, s_1, s_2 are the sums of the cypher, first, second, and succeeding powers of the roots of the given equation.

Mr. Roberts then puts $\phi_m(a_0, a_1, a_2 \dots a_n)$

$$= \Sigma a_0^{2n-4} \frac{x_1^m f'(x_2) f'(x_3) \dots f'(x_n)}{f'(x_1)},$$

and then proceeds to show how ϕ_{m-1} can be derived from ϕ_m by a process of differentiation, which he denotes by δ , viz.:

$$(a_0 \frac{d}{da_1} + 2a_1 \frac{d}{da_2} + 3a_2 \frac{d}{da_3} \dots) \phi_m = -m \phi_{m-1};$$

so that if ϕ_m be known, the value of the symmetric function for all indices below m can be obtained by successive differentiations. Now if the above-mentioned determinant be known in terms of the coefficients, by multiplying it by a_0^{2n-4} , we have the value of ϕ_0 : and by substituting in this value for each term the term with the complementary suffix, we deduce the value of ϕ_{2n-4} , whence the truth of the theorem is manifest. Dr. Salmon has called attention to the functions ϕ_m , as furnishing the simplest expressions for a double root by their successive quotients. Mr. Roberts calculates the values of ϕ_m for the cubic, biquadratic, and quintic; and then proceeds to apply these functions to the formation of invariants.

He denotes by F a homogeneous function of the quantities $\phi_0, \phi_1, \phi_2 \dots$, and supposes it to be of such a nature

that $\delta F = 0$, and consequently F a function of the differences of the roots of the given equation, and shows that F will be an invariant; $\phi_0, \phi_1, \phi_2 \dots$ being supposed expressed in terms of $a_0, a_1, a_2 \dots$; if, on replacing each suffix by its complementary one, the total sum of the suffixes remains unaltered.

The following theorems of Mr. Roberts lead to very important results in the general theory of covariants. He considers any function of the differences of the roots of a binary quantic of the n^{th} degree expressed as a function of the a 's, and from this he derives another function by substituting for the suffixes of the a 's which occur in it their complementary values, and denotes the function so derived by λ . He then shows that the following quantity

$$\lambda + x\delta\lambda + \frac{x^2}{1.2} \delta^2\lambda + \frac{x^3}{1.2.3} \delta^3\lambda + \dots$$

is, when rendered homogeneous by the introduction of y , a covariant of the original quantic, and points out that linear covariants are impossible for quantics of even degrees. The function of the differences of the roots, from which the covariant is derived, he calls the *source of the covariant*; and then proves the theorem of such great importance in the theory of covariants, viz., that the source of the product of two covariants is equal to the product of their sources. From this, then, it follows that, if any homogeneous relation, which is rational and integral, exist between functions which depend on the differences of the roots of an equation (in which a_n is included), the same relation subsists between the covariants which are derived from these functions. Again, since the differential coefficient of any function of the differences of the roots with respect to the last coefficient a_n is also a function of the differences of the roots, this derived function gives rise to a covariant of

the quantic analogous to the evectant of an invariant. As amongst the differences of the roots of an equation of the n^{th} degree there are but $n - 1$ independent quantities, it would appear that all functions of the differences of the roots could be expressed by $n - 1$ independent functions of the differences. The determination of these for the quantic of the n^{th} degree offers no difficulty, and the entire method is comprised in the following theorem: that, *for n even*, all rational and integral symmetric functions of the differences of the roots expressed homogeneously in terms of the a 's, and multiplied by a proper power of a_0 , can be similarly expressed by the quadrinvariants of the quantics

$$(a_0, a_1, a_2, a_{2k})(x, y)^{2k},$$

and by the sources of the evectants of the quartinvariants of the quantics

$$(a_0, a_1, a_2, a_{2k-1})(x, y)^{2k-1},$$

where k has all values in succession from 1 to $\frac{n}{2}$. *For n odd*, the functions of the differences of the roots are expressed by the quadrinvariants of the quantics

$$(a_0, a_1, a_2, \dots, a_{2k-2})(x, y)^{2k-2},$$

and by the sources of the evectants of the quartinvariants of the quantics

$$(a_0, a_1, a_2, a_{2k-1})(x, y)^{2k-1},$$

where k has all values in succession from 2 to $\frac{n+1}{2}$.

These functions are alternately of the second and third degrees in the coefficients, and of the degrees 2, 3, 4, 5, and so on, in the roots. Mr. Roberts then gives a Table of the above-mentioned functions of the coefficients, and proceeds to resolve the covariants of the quintic given in Cayley's Tables into their independent elements.

The method which Mr. Roberts has employed in his Papers is peculiarly applicable to the discovery of relations existing between functions of the differences of the roots of equations of the higher degrees, and from Mr. Roberts' point of view the theory of covariants becomes identical with the theory of the functions of the differences of the roots of algebraic equations.

His Papers give the complete theory of the covariants of the quintic, in which he shows that all covariants of binary quintics whose source is an even function of the roots, can be expressed by the quintic itself, four other covariants, and an invariant; while covariants whose source is an odd function of the roots can be expressed in terms of the functions already mentioned, and two other covariants.

In his treatment of Invariants and Covariants in general, Mr. Roberts availed himself largely of a remarkable equation which is due to Brioschi, and by means of it arrived at many results of importance.

In the year 1871, Mr. Roberts published his *Tract on the Addition of Elliptic and Hyper-Elliptic Integrals*. In this work he has adopted, as the basis of his investigations, the memoirs of Jacobi on Abelian Integrals; and in the earlier chapters the perfect uniformity of treatment of elliptic and hyper-elliptic functions is exposed, by which their fundamental properties are derived from the employment of Jacobi's method. In this way Mr. Roberts has constructed a trigonometry of hyper-elliptic functions, in a manner analogous to the method of formation of the trigonometry of elliptic functions. The sixth chapter treats of those cases where the first class of hyper-elliptic integrals depends on elliptic integrals; and in the seventh Mr. Roberts has given the analogues of Fagnano's theorem, which bear out the well-known analogy between conic sections and the lines of curvature on an ellipsoid.

The following is a list of the published Papers and Memoirs of Mr. Roberts :—

1. 'Note sur deux systèmes généraux de trajectoires orthogonales.' Liouville, *Journ. Math.* x., 1845, pp. 251-256.
2. 'Sur quelques propriétés des lignes géodésiques et des lignes de courbure de l'ellipsoïde.' Liouville, *Journ. Math.* xi., 1846, pp. 1-4.
3. 'Sur les surfaces dont les rayons de courbure sont égaux mais dirigés en sens opposés.' Liouville, *Journ. Math.* xi., 1846, pp. 300-312.
4. 'On the Lines of Curvature on the Ellipsoid.' *Royal Irish Acad. Proc.* iii., 1847, pp. 383-384.
5. 'Note on a Theorem relating to the Hyperbola.' *Royal Irish Acad. Proc.* iii., 1847, p. 385.
6. 'Extraits de deux lettres relatives à des théorèmes sur les lignes géodésiques sur l'ellipsoïde.' Liouville, *Journ. Math.* xii., 1847, pp. 491-492.
7. 'Theorems on the Lines of Curvature of an Ellipsoid.' *Cambr. & Dubl. Math. Journ.* iii., 1848, pp. 159-163.
8. 'Nouvelles propriétés des lignes géodésiques et des lignes de courbure sur l'ellipsoïde.' Liouville, *Journ. Math.* xii., 1848, pp. 1-11.
9. 'Memoire sur la géométrie de courbes tracées sur la surface d'un ellipsoïde.' *Journ. Math.* xv., 1850, pp. 275-295.
10. 'Discussion analytique de deux surfaces particulières qui jouissent de la propriété d'avoir pour chacun de leurs points les deux rayons de courbure égaux, et de signes contraires.' Liouville, *Journ. Math.* xv., 1850, pp. 323-331.
11. 'Note sur quelques applications de la théorie des surfaces.' *Nouv. Ann. Math.* xv., 1855, pp. 268-271.
12. 'Sur une question d'algèbre relative à deux équations cubiques.' *Nouv. Ann. Math.* xv., 1856, pp. 76-80; xvi., 1857, pp. 366-369.
13. 'Note sur l'équation aux carrés des différences des racines d'une équation du quatrième degré.' *Nouv. Ann. Math.* xvii., 1858, pp. 268-269.
14. 'Note sur l'équation aux carrés des différences des racines d'une équation du degré n.' *Nouv. Ann. Math.* xvii., 1858, pp. 440-441.
15. 'Note sur les équations du quatrième degré.' *Nouv. Ann. Math.* xviii., 1859, pp. 87-89.
16. 'Extrait d'une lettre sur la théorie des équations algébriques.' Tortolini, *Annali*, ii., 1859, pp. 330-332.
17. 'Sur quelques questions d'algèbre.' *Nouv. Ann. Math.* xix., 1860, pp. 23-26.

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18. 'Sur quelques fonctions symétriques des racines des équations algébriques.' Tortolini, *Annali*, iii., 1860, pp. 172-178.
19. 'Sur les covariants des formes binaires du cinquième degré.' Tortolini, *Annali*, iii., 1860, pp. 340-344.
20. 'On some Symmetric Functions of the Roots of Algebraic Equations.' *Quart. Journ. Math.* iv., 1861, pp. 57-65.
21. 'On the Covariants of a Binary Quantic of the n^{th} degree.' *Quart. Journ. Math.* iv., 1861, pp. 168-178, 324-327; v., 1862, pp. 144-151.
22. 'Note on the Equation of the Squares of the Differences of the Roots of a Quintic.' *Quart. Journ. Math.* iv., 1861, pp. 234, 235.
23. 'On some Applications of Algebra to the Theory of Covariants' (1861). *Quart. Journ. Math.* v., 1862, pp. 18-20.
24. 'Note on certain Curves of the Third Degree.' *Quart. Journ. Math.* v., 1862.

W. R. WESTROPP ROBERTS.

GREEK GEOMETRY FROM THALES TO
EUCLID.*

IV.

DURING the last thirty years of the fifth century before the Christian era no progress was made in geometry at Athens, owing to the Peloponnesian War, which, having broken out between the two principal States of Greece, gradually spread to the other States, and for the space of a generation involved almost the whole of Hellas. Although it was at Syracuse that the issue was really decided, yet the Hellenic cities of Italy kept aloof from the contest,¹ and Magna Graecia enjoyed at this time

* In the preparation of this part of my Paper I have again made use of the works of Bretschneider and Hankel, and have derived much advantage from the great work of Cantor—*Vorlesungen über Geschichte der Mathematik*. I have also constantly used the *Index Graecitatis* appended by Hultsch to vol. iii. of his edition of Pappus; which, indeed, I have found invaluable.

The number of students of the history of mathematics is ever increasing; and the centres in which this subject is cultivated are becoming more numerous.

I propose to notice at the end of this part of the Paper some recent publications on the history of Mathematics and new editions of ancient mathema-

tical works, which have appeared since the last part was published.

¹ At the time of the Athenian expedition to Sicily they were not received into any of the Italian cities, nor were they allowed any market, but had only the liberty of anchorage and water—and even that was denied them at Tarentum and Locri. At Rhegium, however, though the Athenians were not received into the city, they were allowed a market without the walls; they then made proposals to the Rhegians, begging them, as Chalcidians, to aid the Leontines. ‘To which was answered, that they would take part with neither, but whatever should seem fitting to the rest of the Italians that they also would do.’ Thucyd. vi. 44.

a period of comparative rest, and again became flourishing. This proved to be an event of the highest importance: for, some years before the commencement of the Peloponnesian War, the disorder which had long prevailed in the cities of Magna Graecia had been allayed through the intervention of the Achaeans,² party feeling, which had run so high, had been soothed, and the banished Pythagoreans allowed to return. The foundation of Thurii (443 B.C.), under the auspices of Pericles, in which the different Hellenic races joined, and which seems not to have incurred any opposition from the native tribes, may be regarded as an indication of the improved state of affairs, and as a pledge for the future.³ It is probable that

² 'The political creed and peculiar form of government now mentioned also existed among the Achaeans in former times. This is clear from many other facts, but one or two selected proofs will suffice, for the present, to make the thing believed. At the time when the Senate-houses (*συνέδρια*) of the Pythagoreans were burnt in the parts about Italy then called Magna Graecia, and a universal change of the form of government was subsequently made (as was likely when all the most eminent men in each State had been so unexpectedly cut off), it came to pass that the Grecian cities in those parts were inundated with bloodshed, sedition, and every kind of disorder. And when embassies came from very many parts of Greece with a view to effect a cessation of differences in the various States, the latter agreed in employing the Achaeans, and their well-known integrity, for the removal of existing evils. Not only at this time did they adopt the system of the Achaeans, but, some time after, they

set about imitating their form of government in a complete and thorough manner. For the people of Crotona, Sybaris and Caulon sent for them by common consent; and first of all they established a common temple dedicated to Zeus, 'the Giver of Concord,' and a place in which they held their meetings and deliberations: in the second place, they took the customs and laws of the Achaeans, and applied themselves to their use, and to the management of their public affairs in accordance with them. But some time after, being hindered by the overbearing power of Dionysius of Syracuse, and also by the encroachments made upon them by the neighbouring natives of the country, they renounced them, not voluntarily, but of necessity.' Polybius, ii. 39. Polybius uses *συνέδριον* for the senate at Rome: there would be one in each Graeco-Italian State—a point which, as will be seen, has not been sufficiently noted.

³ The foundation of Thurii seems to

the pacification was effected by the Achaeans on condition that, on the one hand, the banished Pythagoreans should be allowed to return to their homes, and, on the other, that they should give up all organised political action.⁴ Whether this be so or not, many Pythagoreans returned to Italy, and the Brotherhood ceased for ever to exist as a political association.⁵ Pythagoreanism, thus purified,

have been regarded as an event of high importance; Herodotus was amongst the first citizens, and Empedocles visited Thurii soon after it was founded. The names of the tribes of Thurii show the pan-Hellenic character of the foundation.

⁴ Chaignet, *Pythagore et la Philosophie Pythagoricienne*, i. p. 93, says so, but does not give his authority; the passage in Polybius, ii. 39, to which he refers, does not contain this statement.

⁵ There are so many conflicting accounts of the events referred to here that it is impossible to reconcile them (cf. *HERMATHENA*, vol. iv., p. 181). The view which I have adopted seems to me to fit best with the contemporary history, with the history of geometry, and with the balance of the authorities. Zeller, on the other hand, thinks that the most probable account is 'that the first public outbreak must have taken place after the death of Pythagoras, though an opposition to him and his friends may perhaps have arisen during his lifetime, and caused his migration to Metapontum. The party struggles with the Pythagoreans, thus begun, may have repeated themselves at different times in the cities of Magna Graecia, and the variations in the statements may be partially accounted for as recollections of these different facts. The burning of the assembled Pytha-

goreans in Crotona and the general assault upon the Pythagorean party most likely did not take place until the middle of the fifth century; and, lastly, Pythagoras may have spent the last portion of his life unmolested at Metapontum.' (Zeller, *Pre-Socratic Philosophy*, vol. i., p. 360, E. T.).

Ueberweg takes a similar view :—

'But the persecutions were also several times renewed. In Crotona, as it appears, the partisans of Pythagoras and the Cylonians were, for a long time after the death of Pythagoras, living in opposition as political parties, till at length, about a century later, the Pythagoreans were surprised by their opponents, while engaged in a deliberation in the 'house of Milo' (who himself had died long before), and the house being set on fire and surrounded, all perished, with the exception of Archippus and Lysis of Tarentum. (According to other accounts, the burning of the house, in which the Pythagoreans were assembled, took place on the occasion of the first reaction against the Society, in the lifetime of Pythagoras.) Lysis went to Thebes, and was there (soon after 400 B. C.) a teacher of the youthful Epaminondas.' (Ueberweg, *History of Philosophy*, vol. i., p. 46, E. T.)

Zeller, in a note on the passage quoted above, gives the reasons on

continued as a religious society and as a philosophic School; further, owing to this purification and to the members being thus enabled to give their undivided attention and their whole energy to the solution of scientific questions, it became as distinguished and flourishing as ever: at this time, too, remarkable instances of devoted friendship and of elevation of character are recorded of

which his suppositions are chiefly based. Chaignet, *Pyth. et la Phil. Pyth.* vol. i., p. 88, and note, states Zeller's opinion, and, while admitting that the reasons advanced by him do not want force, says that they are not strong enough to convince him: he then gives his objections. Chaignet, further on, p. 94, n., referring to the name Italian, by which the Pythagorean philosophy is known, says: 'C'est même ce qui me fait croire que les luttes intestines n'ont pas eu la durée que suppose M. Zeller; car si les pythagoriciens avaient été exilés pendant près de soixante-dix ans de l'Italie, comment le nom de l'Italie serait-il devenu ou resté attaché à leur école?' Referring to this objection of Chaignet, Zeller says 'I know not with what eyes he can have read a discussion which expressly attempts to show that the Pythagoreans were not expelled till 440, and returned before 406' (*loc. cit.* p. 363, note).

To the objections urged by Chaignet I would add—

1. Nearly all agree in attributing the origin of the troubles in Lower Italy to the events which followed the destruction of Sybaris.

2. The fortunes of Magna Graecia seem to have been at their lowest ebb at the time of the Persian War; this appears from the fact that, before the battle of Salamis, ambassadors were

sent by the Lacedaemonians and Athenians to Syracuse and Corcyra, to invite them to join the defensive league against the Persians, but passed by Lower Italy.

3. The revival of trade consequent on the formation of the Confederacy of Delos, 476 B. C., for the protection of the Aegean Sea, must have had a beneficial influence on the cities of Magna Graecia, and the foundation of Thurii, 443 B. C., is in itself an indication that the settlement of the country had been already effected.

4. The answer of the Rhegians to Nicias, 415 B. C., shows that at that time there existed a good understanding between the Italiot cities.

5. Zeller's argument chiefly rests on the assumption that Lysis, the teacher of Epaminondas, was the same as the Lysis who in nearly all the statements is mentioned along with Archippus as being the only Pythagoreans who escaped the slaughter. Bentley had long ago suggested that they were not the same. Lysis and Archippus are mentioned as having handed down Pythagorean lore as heir-looms in their families (Porphyrus, *de vita Pyth.* p. 101, Didot). This fact is in my judgment decisive of the matter; for when Lysis, the teacher of Epaminondas, lived, there were no longer any secrets. See HERMATHENA, vol. iii., p. 179, n.

some of the body. Towards the end of this and the beginning of the following centuries encroachments were made on the more southerly cities by the native populations, and some of them were attacked and taken by the elder Dionysius:⁶ meanwhile Tarentum, provided with an excellent harbour, and, on account of its remote situation, not yet threatened, had gained in importance, and was now the most opulent and powerful city in Magna Graecia. In this city, at this time, Archytas—the last great Pythagorean—grew to manhood.

Archytas of Tarentum⁷ was a contemporary of Plato (428–347 B. C.), but probably senior to him, and was said by some to have been one of Plato's Pythagorean teachers⁸ when he visited Italy. Their friendship⁹ was proverbial, and it was he who saved Plato's life when he was in danger of being put to death by the younger Dionysius (about 361 B. C.). Archytas was probably, almost certainly, a pupil of Philolaus.¹⁰ We have the following particulars of his life:—

⁶ In 393 B. C. a league was formed by some of the cities in order to protect themselves against the Lucanians and against Dionysius. Tarentum appears not to have joined the league till later, and then its colony Heraclea was the place of meeting. The passage in Thucydides, quoted above, shows, however, that long before that date a good understanding existed between the cities of Magna Graecia.

⁷ See Diog. Laert. viii. c. 4. See also J. Navarro, *Tentamen de Archytas Tarentini vita atque operibus*, Paris Prior. Hafniae, 1819, and authorities given by him.

⁸ Cic. *de Fin.* v. 29, 87; *Rep.* i. 10, 16; *de Senec.* 12, 41. Val. Max. viii. 7.

⁹ Iambl., *de Vit. Pyth.* 127, p. 48, ed. Didot. 'Verum ergo illud est, quod a Tarentino Archyta, ut opinor, dici solitum, nostros senes commemorare audivi ab aliis senibus auditum: si quis in caelum ascendisset naturamque mundi et pulchritudinem siderum perspexisset, insuavem illam admirationem ei fore, quae jucundissima fuisset, si aliquem cui narraret habuisset. Sic natura solitarium nihil amat, semperque ad aliquod tamquam adminiculum adnititur, quod in amicissimo quoque dulcissimum est.'—Cic. *De Amic.* 23, 87.

¹⁰ Cic. *de Oratore*, Lib. III. xxxiv. 139, aut *Philolaus Archytam Tarentinum*? The common reading *Philolaum Archytas Tarentinus*, which is manifestly wrong, was corrected by Orellius.

He was a great statesman, and was seven times¹¹ appointed general of his fellow-citizens, notwithstanding the law which forbade the command to be held for more than one year, and he was, moreover, chosen commander-in-chief, with autocratic powers, by the confederation of the Hellenic cities of Magna Graecia;¹² it is further stated that he was never defeated as a general, but that, having once given up his command through being envied, the troops he had commanded were at once taken prisoners: he was celebrated for his domestic virtues, and several touching anecdotes are preserved of his just dealings with his slaves, and of his kindness to them and to children.¹³ Aristotle even mentions with praise a toy that was invented by him for the amusement of infants:¹⁴ he was the object of universal admiration on account of his being endowed with every virtue;¹⁵ and Horace, in a beautiful Ode,¹⁶ in which he refers to the death of Archytas by shipwreck in the Adriatic Sea, recognises his eminence as an arithmetician, geometer, and astronomer.

In the list of works written by Aristotle, but unfortunately lost, we find three books on the philosophy of Archytas, and one [τὰ ἐκ τοῦ Τιμαίου καὶ τῶν Ἀρχυτέλων ᾗ]; these, however, may have been part of his works¹⁷ on the

¹¹ Diog. Laert. *loc. cit.* Ælian, *Var. Hist.* vii. 14, says *six*.

¹² Τοῦ κοινοῦ δὲ τῶν Ἰταλιωτῶν προέστη, στρατηγὸς αἰρεθεὶς αὐτοκράτωρ ὑπὸ τῶν πολιτῶν καὶ τῶν περὶ ἐκείνον τὸν τόπον Ἑλλήνων. Suidas, *sub v.* This title *στρατ. αὐτ.* was conferred on Nicias and his colleagues by the Athenians when they sent their great expedition to Sicily: it was also conferred by the Syracusans on the elder Dionysius: Diodorus, xiii. 94. See Arnold, *Hist. of Rome*, i. p. 448, n. 18.

¹³ As to the former, which was in

accordance with Pythagorean principles, see Iambl. *de vit. Pyth.* xxxi. 197, pp. 66, 67, ed. Did.; Plutarch, *de ed. puer.* iii., p. 12, ed. Did.; as to the latter, see Athenaeus, xii. 16; Ælian, *Var. Hist.* xii. 15.

¹⁴ Aristot. *Pol.* V. (8), c. vi. See also Suidas.

¹⁵ ἑθαυμάζετο δὲ καὶ παρὰ τοῖς πολλοῖς ἐπὶ πόσῃ ἀρετῇ, Diog. Laert. *loc. cit.*

¹⁶ i. 28.

¹⁷ Diog. Laert. v. 1, ed. Cobet, p. 116. This, however, could hardly have been

Pythagoreans which occur in the same list, but which also are lost. Some works attributed to Archytas have come down to us, but their authenticity has been questioned, especially by Gruppe, and is still a matter of dispute:¹⁸ these works, however, do not concern geometry.

He is mentioned by Eudemus in the passage quoted from Proclus in the first part of this Paper (HERMATHENA, vol. iii. p. 162) along with his contemporaries, Leodamas of Thasos and Theaetetus of Athens, who were also contemporaries of Plato, as having increased the number of demonstrations of theorems and solutions of problems, and developed them into a larger and more systematic body of knowledge.¹⁹

The services of Archytas, in relation to the doctrine of proportion, which are mentioned in conjunction with those of Hippasus and Eudoxus, have been noticed in HERMATHENA, vol. iii. pp. 184 and 201.

One of the two methods of finding right-angled triangles whose sides can be expressed by numbers—the Platonic one, namely, which sets out from even numbers—is ascribed to Architas [no doubt, Archytas of Tarentum] by Boethius:²⁰ see HERMATHENA, vol. iii. pp. 190, 191, and note 87. I have there given the two rules of Pytha-

so, as *one* book only on the Pythagoreans is mentioned, and *one* against them.

¹⁸ Gruppe, *Ueber die Fragmente des Archytas und der älteren Pythagoreer*. Berlin, 1840.

¹⁹ Procl. *Comm.*, ed. Fried., p. 66.

²⁰ Boet. *Geom.*, ed. Fried., p. 408. Heiberg, in a notice of Cantor's 'History of Mathematics,' *Revue Critique d'Histoire et de Littérature*, 16 Mai, 1881, remarks, 'Il est difficile de croire à l'existence d'un auteur romain nommé Architas, qui aurait écrit sur

l'arithmétique, et dont le nom, qui ne serait du reste, ni grec ni latin, aurait totalement disparu avec ses œuvres, à l'exception de quelque passages dans Boèce.' The question, however, still remains as to the authenticity of the *Ars Geometriae*. Cantor stoutly maintains that the *Geometry* of Boethius is genuine; Friedlein, the editor of the edition quoted, on the other hand, dissents; and the great majority of philologists agree in regarding the question as still *sub judice*. See *Rev. Crit.* loc. cit.

goras and Plato for finding right-angled triangles, whose sides can be expressed by numbers; and I have shown how the method of Pythagoras, which sets out from odd numbers, results at once from the consideration of the formation of squares by the addition of consecutive gnomons, each of which contains an odd number of squares. I have shown, further, that the method attributed to Plato by Heron and Proclus, which proceeds from even numbers, is a simple and natural extension of the method of Pythagoras: indeed it is difficult to conceive that an extension so simple and natural could have escaped the notice of his successors. Now Aristotle tells us that Plato followed the Pythagoreans in many things;²¹ Alexander Aphrodisiensis, in his *Commentary* on the *Metaphysics*, repeats this statement;²² Asclepius goes further and says, not in many things but in everything.²³ Even Theon of Smyrna, a Platonist, in his work 'Concerning those things which in mathematics are useful for the reading of Plato,' says that Plato in many places follows the Pythagoreans.²⁴ All this being considered, it seems to me to amount almost to a certainty that Plato learned his method for finding right-angled triangles whose sides can be expressed numerically from the Pythagoreans; he probably then introduced it into Greece, and thereby got the credit of having invented his rule. It follows also, I think, that the Architas referred to by Boethius could be no other than the great Pythagorean philosopher of Tarentum.

The belief in the existence of a Roman agrimensor named Architas, and that he was the man to whom Boethius—or the pseudo-Boethius—refers, is founded on a

²¹ Arist., *Met.* i. 6, p. 987, a, ed. Bek.

²² Alex. Aph. *Schol. in Arist.*, Brand., p. 548, a, 8.

²³ Asclep. *Schol.* l. c., p. 548, a, 35.

²⁴ Theon. Smyrn. *Arithm.*, ed. de Gelder, p. 17.

remarkable passage of the *Ars Geometriae*,²⁵ which, I think, has been incorrectly interpreted, and also on another passage in which Euclid is mentioned as prior to Architas.²⁶ The former passage, which is as follows:—‘Sed jam tempus est ad geometricalis mensae traditionem ab Archita, non sordido hujus disciplinae auctore, Latio accommodatam venire, si prius praemisero,’ &c., is translated by Cantor thus: ‘But it is time to pass over to the communication of the geometrical table, which was prepared for Latium by Architas, no mean author of this science, when I shall first have mentioned,’ &c.:’ this, in my opinion, is not the sense of the passage. I think that ‘ab Archita’ should be taken with *traditionem*, and not with *accommodatam*, the correct translation being—‘But it is now time to come to the account of the geometrical table as given by Architas (“no mean authority” in this branch of learning), as adapted by me to Latin readers; when,’ &c. Now it is remarkable—and this, as far as I know, has been overlooked—that the author of the *Ars Geometriae*, whoever he may have been, applies to Architas the very expression applied by Archytas to Pythagoras in Hor. *Od.* i. 28:

‘iudice te, non sordidus auctor
‘naturae verique.’

The mention of Euclid as prior to Archytas is easily explained, since we know that for centuries Euclid the geometer was confounded with Euclid of Megara,²⁷ who was a contemporary of Archytas, but senior to him.

We learn from Diogenes Laertius that he was the first to employ scientific method in the treatment of Mechanics,

²⁵ Boet. ed. Fried., p. 393.

²⁶ *Id.*, p. 412.

²⁷ Cantor, *Gesch. der Math.*, p. 493.

²⁸ This error seems to have originated

with Valerius Maximus (viii. 12), an author probably of the time of the emperor Tiberius, and was current in the middle ages.

by introducing the use of mathematical principles; and was also the first to apply a mechanical motion in the solution of a geometrical problem, while trying to find by means of the section of a semi-cylinder two mean proportionals, with a view to the duplication of the cube.²⁹

Eratosthenes, too, in his letter to Ptolemy III., having related the origin of the Delian Problem (see HERMATHENA, vol. iv. p. 212), tells us that 'the Delians sent a deputation to the geometers who were staying with Plato at Academia, and requested them to solve the problem for them. While they were devoting themselves without stint of labour to the work, and trying to find two mean proportionals between the two given lines, Archytas of Tarentum is said to have discovered them by means of his semi-cylinders, and Eudoxus by means of the so-called 'Curved Lines' (διὰ τῶν καλουμένων καμπύλων γραμμῶν). It was the lot, however, of all these men to be able to solve the problem with satisfactory demonstration; while it was impossible to apply their methods practically so that they should come into use; except, to some small extent and with difficulty, that of Menaechmus.'³⁰

²⁹ οὗτος πρῶτος τὰ μηχανικὰ ταῖς μαθηματικαῖς προσχρησάμενος ἀρχαῖς μεθέδευσε, καὶ πρῶτος κίνησιν ὀργανικὴν διαγράμματι γεωμετρικῇ προσήγαγε, διὰ τῆς τομῆς τοῦ ἡμικυλίνδρου δύο μέσας ἀνὰ λόγον λαβεῖν ζητῶν εἰς τὸν τοῦ κύβου διπλασιασμόν. Diog. Laert. *loc. cit.*, ed. Cobet, p. 224.

That is, he first propounded the affinity and connexion of Mechanics and Mathematics with one another, by applying Mathematics to Mechanics, and mechanical motion to Mathematics.

This seems to be the meaning of the passage: but Mechanics, or rather Statics, was first raised to the rank of a demonstrative science by Archimedes, who founded it on the principle of the lever. Archytas, however, was a practical mechanician, and his wooden flying dove was the wonder of antiquity. Favonius, see Aul. Gell. *Noctes Atticae*, x. 12.

³⁰ Archimedis, ex recens. Torelli, p. 144; Archimedis, *Opera Omnia*, ed. J. L. Heiberg, vol. iii. pp. 104, 106.

$\alpha\beta$, equal to γ , be inserted in it; and being produced let it meet at the point π , the line touching the circle at the point δ : further let $\beta\epsilon\zeta$ be drawn parallel to $\pi\delta$. Now let it be conceived that a semicylinder is erected on the semicircle $\alpha\beta\delta$, at right angles to it: also, at right angles to it, let there be drawn on the line $\alpha\delta$ a semicircle lying in the parallelogram of the cylinder. Then let this semicircle be turned round from the point δ towards β , the extremity α of the diameter remaining fixed; it will in its circuit cut the cylindrical surface and describe on it a certain line. Again, if, the line $\alpha\delta$ remaining fixed, the triangle $\alpha\pi\delta$ be turned round, with a motion contrary to that of the semicircle, it will form a conical surface with the straight line $\alpha\pi$, which in its circuit will meet the cylindrical line [*i.e.* the line which is described on the cylindrical surface by the motion of the semicircle] in some point; at the same time the point β will describe a semicircle on the surface of the cone. Now, at the place³³ of meeting of the lines, let the semicircle in the course of its motion have a position $\delta\kappa\alpha$, and the triangle in the course of its opposite motion a position $\delta\lambda\alpha$; and let the point of the said meeting be κ . Also let the semicircle described by β be $\beta\mu\zeta$, and the common section of it and of the circle $\beta\delta\zeta\alpha$ be $\beta\zeta$: now from the point κ let a perpendicular be drawn to the plane of the semicircle $\beta\delta\alpha$; it will fall on the periphery of the circle, because the cylinder stands perpendicularly. Let it fall, and let it be $\kappa\iota$; and let the line joining the points ι and α meet the line $\beta\zeta$ in the point θ ; and let the right line $\alpha\lambda$ meet the semicircle $\beta\mu\zeta$ in the point μ ; also let the lines $\kappa\delta$, $\mu\iota$, $\mu\theta$ be drawn.

‘Since, then, each of the semicircles $\delta\kappa\alpha$, $\beta\mu\zeta$ is at right angles to the underlying plane, and, therefore, their common

³³ ἐχέτω δὴ θέσιν κατὰ τὸν τόπον τῆς συμπτώσεως τῶν γραμμῶν τὸ μὲν κινούμενον ἡμικύκλιον ὡς τὴν τοῦ $\Delta\kappa\Lambda$., &c.

section $\mu\theta$ is at right angles to the plane of the circle; so also is the line $\mu\theta$ at right angles to $\beta\zeta$. Therefore, the rectangle under the lines $\theta\beta$, $\theta\zeta$; that is, under θa , θi ; is equal to the square on $\mu\theta$. The triangle $a\mu i$ is therefore similar to each of the triangles $\mu i\theta$, $\mu a\theta$, and the angle $\mu a i$ is right. But the angle $\delta' \kappa a$ is also right. Therefore, the lines $\kappa\delta'$, μi are parallel. And there will be the proportion:—As the line $\delta' a$ is to $a\kappa$, *i. e.* κa to $a i$, so is the line $i a$ to $a\mu$, on account of the similarity of the triangles. The four straight lines $\delta' a$, $a\kappa$, $a i$, $a\mu$ are, therefore, in continued proportion. Also the line $a\mu$ is equal to γ , since it is equal to the line $a\beta$. So the two lines $a\delta$, γ being given, two mean proportionals have been found, *viz.* $a\kappa$, $a i$.'

Although this extract from the *History of Geometry* of Eudemus seems to have been to some extent modernized by the omission of certain archaic expressions such as those referred to in Part II. of this Paper (HERMATHENA, vol. iv. p. 199, n. 44), yet the whole passage appears to me to bear the impress of Eudemus's clear and concise style: further, it agrees perfectly with the report of Diogenes Laertius, and also with the words in the letter of Eratosthenes to Ptolemy III., which have been given above. If now we examine its contents and compare them with those of the more ancient fragment, we shall find a remarkable progress.

The following theorems occur in it:—

(a). If a perpendicular be drawn from the vertex of a right-angled triangle on the hypotenuse, each side is a mean proportional between the hypotenuse and its adjacent segment.³⁴

(b). The perpendicular is the mean proportional be-

³⁴ The whole investigation is, in fact, based on this theorem.

tween the segments of the hypotenuse;³⁵ and, conversely, if the perpendicular on the base of a triangle be a mean proportional between the segments of the base, the vertical angle is right.

(c). If two chords of a circle cut one another, the rectangle under the segments of one is equal to the rectangle under the segments of the other. This was most probably obtained by similar triangles, and, therefore, required the following theorem, the ascription of which to Hippocrates has been questioned.

(d). The angles in the same segment of a circle are equal to each other.

(e). Two planes which are perpendicular to a third plane intersect in a line which is perpendicular to that plane, and also to their lines of intersection with the third plane.

Archytas, as we see from his solution, was familiar with the generation of cylinders and cones, and had also clear ideas on the interpenetration of surfaces; he had, moreover, a correct conception of geometrical loci, and of their application to the determination of a point by means of their intersection. Further, since by the theorem of Thales the point μ must lie on a semicircle of which at is the diameter, we shall see hereafter that in the solution of Archytas the same conceptions are made use of and the same course of reasoning is pursued, which, in the hands of his successor and contemporary Menaechmus, led to the discovery of the three conic sections. Such knowledge and inventive power surely outweigh in importance many special theorems.

Cantor, indeed, misconceiving the sense of the word *τόπος*, supposes that the expression '*geometrical locus*'

³⁵ The solutions of the Delian problem attributed to Plato, and by Menaechmus, are founded on this theorem.

occurs in this passage. He says: 'In the text handed down by Eutocius, even the word $\tau\acute{o}\pi o\varsigma$, *geometrical locus*, occurs. If we knew with certainty that here Eutocius reports literally according to Eudemus, and Eudemus literally according to Archytas, this expression would be very remarkable, because it corresponds with an important mathematical conception, the beginnings of which we are indeed compelled to attribute to Archytas, whilst we find it hard to believe in a development of it at that time which has proceeded so far as to give it a name. In our opinion, therefore, Eudemus, who was probably followed very closely by Eutocius, allowed himself, in his report on the doubling of the cube by Archytas, some changes in the style, and in this manner the word "*locus*," which in the meanwhile had obtained the dignity of a technical term, has been inserted. This supposition is supported by the fact that the whole statement of the procedure of Archytas sounds far less antique than, for instance, that of the attempts at quadrature of Hippocrates of Chios. Of course we only assume that Eudemus has, to a certain extent, treated the wording of Archytas freely. The sense he must have rendered faithfully, and thus the conclusions we have drawn as to the stereometrical knowledge of Archytas remain untouched.'"

This reasoning of Cantor is based on a misconception of the meaning of the passage in which the word $\tau\acute{o}\pi o\varsigma$ occurs; $\tau\acute{o}\pi o\varsigma$ in it merely means *place*, as translated above. Though Cantor's argument, founded on the occurrence of the word $\tau\acute{o}\pi o\varsigma$, is not sound; yet, as I have said, the solution of Archytas involves the conception of *geometrical loci*, and the determination of a point by means of their intersection—not merely 'the beginnings of the conception,' as Cantor supposes; for surely such a notion could

* Cantor, *Vorlesungen über Geschichte der Mathematik*, p. 197.

not first arise with a curve of double curvature. The first beginning of this notion has been referred to Thales in the first part of this Paper³⁷ (HERMATHENA, vol. iii. p. 170).

Further, Archytas makes use of the theorem of Thales—the angle in a semicircle is right. He shows, moreover, that $\mu\theta$ is a mean proportional between $a\theta$ and θ_i , and concludes that the angle μa is right: it seems to me, therefore, to be a fair inference from this that he must have seen that the point μ may lie anywhere on the circumference of a circle of which a_i is the diameter. Now Eutocius, in his *Commentaries* on the *Conics* of Apollonius,³⁸ tells us what the old geometers meant by *Plane Loci*, and gives some example of them, the first of which is this very theorem. It is as follows:—

‘A finite straight line being given, to find a point from which the perpendicular drawn to the given line shall be a mean proportional between the segments. Geometers call such a point a *locus*, since not one point only is the solution of the problem, but the whole place which the circumference of a circle described on the given line as diameter occupies: for if a semicircle be described on the given line, whatever point you may take on the circumference, and draw from it a perpendicular on the diameter, that point will solve the problem.’

Eutocius then gives a second example—‘A straight line being given, to find a point without it from which the

³⁷ Speaking of the solution of the ‘Delian Problem’ by Menaechmus, Favaro observes: ‘Avvertiamo espressamente che Menecmo non fu egli stesso l’inventore di questa dottrina [dei luoghi geometrici]. Montucla (*Histoire des Mathématiques*, nouvelle édition, tome premier. A Paris, An. vii. p. 171), e Chasles (*Aperçu Historique*. Bruxelles, 1837, p. 5) la attri-

buiscono alla scuola di Platone; G. Johnston Allman (*Greek Geometry from Thales to Euclid*. Dublin, 1877, p. 171) la fa risalire a Talete, appoggiando la sua argomentazione con valide ragioni.’ Antonio Favaro, *Notizie Storico-Critiche Sulla Costruzione delle Equazioni*. Modena, 1878, p. 21.

³⁸ Apollonius, *Conic.*, ed. Halleius, p. 10.

straight lines drawn to its extremities shall be equal to each other'—on which he makes observations of a similar character, and then adds: 'To the same effect Apollonius himself writes in his *Locus Resolutus*, with the subjoined [figure]:

"Two points in a plane being given, and the ratio of two unequal lines being also given, a circle can be described in the plane, so that the straight lines inflected from the given points to the circumference of the circle shall have the same ratio as the given one."

Then follows the solution, which is accompanied with a diagram. As this passage is remarkable in many respects, I give the original:—

Τὸ δὲ τρίτον τῶν κωνικῶν περιέχει, φησὶ, πολλὰ καὶ παράδοξα θεωρήματα χρήσιμα πρὸς τὰς συνθέσεις τῶν στερεῶν τόπων. Ἐπιπέδους τόπους ἔθος τοῖς παλαιοῖς γεωμέτραις λεγεῖν, ὅτε τῶν προβλημάτων οὐκ ἂν ἐνὸς σημείου μόνον, ἀλλ' ἀπὸ πλειόνων γίνεται τὸ ποίημα· οἷον ἐν ἐπιτάξει, τῆς εὐθείας δοθείσης πεπερασμένης εὑρεῖν τι σημεῖον ἂν οὐ ἢ ἀχθεῖσα κάθετος ἐπὶ τὴν δοθεῖσαν μέση ἀνάλογον γίνεται τῶν τμημάτων. Τόπον καλοῦσι τὸ τοιοῦτον, οὐ μόνον γὰρ ἐν σημείῳ ἐστὶ τὸ ποιοῦν τὸ πρόβλημα, ἀλλὰ τόπος ὅλος ὃν ἔχει ἡ περιφέρεια τοῦ περὶ διάμετρον τὴν δοθεῖσαν εὐθείαν κύκλου· ἐὰν γὰρ ἐπὶ τῆς δοθείσης εὐθείας ἡμικύκλιον γραφῇ, ὅπερ ἂν ἐπὶ τῆς περιφερείας λάβῃς σημεῖον, καὶ ἀπ' αὐτοῦ κάθετον ἀγάγῃς ἐπὶ τὴν διάμετρον, ποιήσῃ τὸ προβληθέν . . . ὅμοιον καὶ γράφει αὐτὸς Ἀπολλώνιος ἐν τῷ ἀναλυμένῳ τόπῳ, ἐπὶ τοῦ ὑποκειμένου.³⁰

Δύο δοθέντων σημείων ἐν ἐπιπέδῳ καὶ λόγον δοθέντος ἀνίσων εὐθειῶν δυνατὸν ἐστὶν ἐν τῷ ἐπιπέδῳ γράψαι κύκλον ὥστε τὰς ἀπὸ τῶν δοθέντων σημείων ἐπὶ τὴν περιφέρειαν τοῦ κύκλου κλωμένας εὐθείας λόγον ἔχειν τὸν αὐτὸν τῷ δοθέντι.

It is to be observed, in the first place, that a contrast is

³⁰ Heiberg, in his *Litterargeschichtliche Studien über Euklid*, p. 70, reads τὸ ὑποκείμενον, and adds in a note that Halley has ὑποκειμένῳ, in place of τὸ

ὑποκείμενον, a statement which is not correct. I have interpreted Halley's reading as referring to the subjoined diagram.

here made between Apollonius and the old geometers (οἱ παλαιοὶ γεωμέτραι), the same expression which, in the second part of this Paper (HERMATHENA, vol. iv. p. 217), we found was used by Pappus in speaking of the geometers before the time of Menaechmus. Secondly, on examination it will be seen that *loci*, as, *e. g.*, those given above, partake of a certain ambiguity, since they can be enunciated either as theorems or as problems; and we shall see later that, about the middle of the fourth century B. C., there was a discussion between Speusippus and the philosophers of the Academy on the one side, and Menaechmus, the pupil and, no doubt, successor of Eudoxus, and the mathematicians of the school of Cyzicus, on the other, as to whether everything was a theorem or everything a problem: the mathematicians, as might be expected, took the latter view, and the philosophers, just as naturally, held the former. Now it was to propositions of this ambiguous character that the term *porism*, in the sense in which it is now always used, was applied—a signification which was quite consistent with the etymology of the word.⁴⁰ Lastly, the reader will not fail to observe that the first of the three *loci* given above is strikingly suggestive of the method of Analytic Geometry. As to the term τόπος, it may be noticed that Aristæus, who was later than Menaechmus, but prior to Euclid, wrote five books on *Solid Loci* (οἱ στερεοὶ τόποι).⁴¹ In conclusion, I cannot agree with Cantor's view that the passage has the appearance of being modernized in expression:

⁴⁰ *πορίσθαι*, to procure. The question is—in a *theorem*, to *prove* something; in a *problem*, to *construct* something; in a *porism*, to *find* something. So the conclusion of the theorem is, *ὅπερ εἶδει δεῖξαι*, Q. E. D., of the problem, *ὅπερ εἶδει ποιῆσαι*, Q. E. F., and of the porism, *ὅπερ εἶδει εὑρεῖν*, Q. E. I.

Amongst the ancients the word *porism* had also another signification, that of corollary. See Heib., *Litt. Stud. über Eukl.*, pp. 56–79, where the obscure subject of *porisms* is treated with remarkable clearness.

⁴¹ Pappi, *Collect.*, ed. Hultsch, vol. ii. p. 672.

there is nothing in the text from which any alteration in phraseology can be inferred, as there can be in the two solutions of the 'Delian Problem' by Menaechmus, in which the words parabola and hyperbola occur.

The solution of Archytas seems to me not to have been duly appreciated. Montucla does not give the solution, but refers to it in a loose manner, and says that it was merely a *geometrical curiosity*, and of no practical importance.⁴³ Chasles, who, as we have seen (HERMATHENA, vol. iii. p. 171), in the history of Geometry before Euclid, copies Montucla, also says that the solution was purely speculative; he even gives an inaccurate description of the construction—taking an *arête* of the cylinder as axis of the cone⁴⁴—in which he is followed by some more recent writers.⁴⁵ Flauti, on the other hand, gives a clear and full account of the method of Archytas, and shows how his solution may be actually constructed. For this purpose it is necessary to give a construction for finding the intersection of the surface of the semi-cylinder with that of the *tore* generated by the revolution of the semicircle round the *side* of the cylinder through the point α as axis; and also for finding the intersection of the surface of the same semi-cylinder with that of the cone described by the revolution of the triangle $\alpha\pi\delta$: the intersection of these curves gives the point κ , and then the point ι , by means of which the problem is solved. Now, in order to determine the point κ , it will be sufficient to find the projections of these two curves on the vertical plane on $\alpha\delta$, which contains the axes of the three surfaces of revolution concerned, and which Archytas calls the parallelogram of the cylinder.

⁴³ 'Mais ce n'étoit-là qu'une curiosité géométrique, uniquement propre à satisfaire l'esprit, et dont la pratique ne sauroit tirer aucun secours.'—Montucla, *Histoire des Mathématiques*,

tom. i. p. 188.

⁴⁴ Chasles, *Histoire de la Géométrie*, p. 6.

⁴⁵ e. g. Hoefel, *Histoire des Math.*, p. 133.

The projection on this plane of the curve of intersection of the *tore* and semi-cylinder can be easily found: the projection of the point κ , for example, is at once obtained by drawing from the point ι , which is the projection of the point κ on the horizontal plane $\alpha\beta\delta$, a perpendicular $\iota\xi$ on $\alpha\delta$, and then at the point ξ erecting in the vertical plane a perpendicular $\xi\eta$ equal to $\iota\kappa$, the ordinate of the semicircle $\alpha\kappa\delta$, corresponding to the point ι ; and in like manner for all other points. The projection on the same vertical plane of the curve of intersection of the cone and semi-cylinder can also be found: for example, the projection of the point κ , which is the intersection of $\alpha\kappa$ and $\iota\kappa$, the sides of the cone and cylinder, on the vertical plane, is the intersection of the projections of these lines on that plane; the latter projection is the line $\xi\eta$, and the former is obtained by drawing in the vertical plane, through the point ϵ , a line $\epsilon\nu$ perpendicular to $\alpha\delta$ and equal to $\theta\mu$, the ordinate of the semicircle $\beta\mu\zeta$, and then joining $\alpha\nu$, and producing it to meet $\xi\eta$; and so for all other points on the curve of intersection of the cone and cylinder.⁴⁵ So far Flauti.

Each of these projections can be constructed by points:—

To find the ordinate of the first of these curves corresponding to any point ξ , we have only to describe a square, whose area is the excess of the rectangle under the line $\alpha\delta$ and a mean proportional between the lines $\alpha\delta$ and $\alpha\xi$, over the square on the mean: the side of this square is the ordinate required.⁴⁶ In order to describe the projection of the intersection of the cone and cylinder, it will be sufficient to find the length, $\alpha\xi$, which corresponds to any ordi-

⁴⁵ Flauti, *Geometria di Sito*, terza edizione. Napoli, 1842, pp. 192–194.

⁴⁶ $\xi\eta^2 = \iota\kappa^2 = \alpha\iota \cdot \iota\delta = \alpha\iota \cdot (\alpha\delta - \alpha\iota)$; but $\alpha\delta = \alpha\delta$; therefore, $\xi\eta^2 = \alpha\delta \cdot \alpha\iota - \alpha\iota^2$.

Again, since $\alpha\delta : \alpha\iota :: \alpha\iota : \alpha\xi$, we have also

$\xi\eta^2 = \alpha\delta \cdot (\sqrt{\alpha\delta \cdot \alpha\xi} - \alpha\xi).$

nate, $\xi\eta$ ($= \iota\kappa$), supposed known, of this curve; and to effect this we have only to apply to the given line $a\epsilon$ a rectangle, which shall be equal to the square on the line $\xi\eta$, and which shall be *excessive* by a rectangle similar to a given one, namely, one whose sides are the lines $a\delta$ and $a\epsilon$ —*i. e.* the greater of the two given lines, between which the two mean proportionals are sought, and the third proportional to it and the less.⁴⁷

$$^{47} \quad \theta\mu^2 = \beta\epsilon^2 - \theta\epsilon^2.$$

Now $\theta\mu = \epsilon\nu$, and $\epsilon\nu : \xi\eta :: a\epsilon : a\xi$;
we have, therefore,

$$\epsilon\nu^2 = \frac{a\epsilon^2 \cdot \xi\eta^2}{a\xi^2} = \beta\epsilon^2 - \theta\epsilon^2;$$

hence

$$\begin{aligned} \xi\eta^2 &= \frac{\beta\epsilon^2}{a\epsilon^2} \cdot a\xi^2 - \frac{\theta\epsilon^2}{a\epsilon^2} \cdot a\xi^2 \\ &= \frac{\beta\epsilon^2}{a\epsilon^2} \cdot a\xi^2 - \iota\xi^2, \end{aligned}$$

since $\theta\epsilon : \iota\xi :: a\epsilon : a\xi$.

But $\iota\xi^2 = a\xi \cdot (a\delta - a\xi)$;

hence we get

$$\xi\eta^2 = \frac{a\beta^2}{a\epsilon^2} \cdot a\xi^2 - a\delta \cdot a\xi;$$

and, finally, since

$$a\delta : a\beta :: a\beta : a\epsilon,$$

we have

$$\xi\eta^2 = \frac{a\delta^2}{a\beta^2} \cdot a\xi^2 - a\delta \cdot a\xi.$$

The equations of these projections can, as M. Paul Tannery has shown (*Sur les Solutions du Problème de Délos par Archytas et par Eudoxe*, Mémoires de la Société des Sciences Physiques et Naturelles de Bordeaux, 2^e série, tome ii. p. 277), be easily obtained by analytic geometry. Taking, as axes of co-ordinates, the line $a\delta$, the tangent to the circle $a\beta\delta$ at the point a , and the side of the cylinder through the point

a , the equations of the three surfaces are:—

the cylinder, $x^2 + y^2 = ax$;

the tore,

$$x^2 + y^2 + z^2 = a\sqrt{x^2 + y^2};$$

the cone,

$$x^2 + y^2 + z^2 = \frac{a^2}{b^2} x^2,$$

where a and b are the lines $a\delta$ and $a\beta$, between which the two mean proportionals are sought.

We easily obtain from these three equations:

$$x = b\sqrt[3]{\frac{b}{a}};$$

$$\sqrt{x^2 + y^2} = \sqrt[3]{ab^2},$$

first mean proportional between b and a ;

$$\sqrt{x^2 + y^2 + z^2} = \sqrt[3]{a^2b},$$

second mean proportional between b and a .

We also obtain easily the projections on the plane of zx of the curves of intersection of the cylinder and tore—

$$z^2 = a\sqrt{x}(\sqrt{a} - \sqrt{x});$$

and of the cylinder and cone,

$$z^2 = \frac{a^2}{b^2} x^2 - ax.$$

These results agree with those obtained above geometrically.

So much ingenuity and ability are shown in the treatment of this problem by Archytas, that the investigation of these projections, in itself so natural,⁴⁸ seems to have been quite within his reach, especially as we know that the subject of Perspective had been treated of already by Anaxagoras and Democritus (see HERMATHENA, vol. iv., pp. 206, 208). It may be observed, further, that the construction of the first projection is easily obtained; and as to the construction of the second projection, we see that it requires merely the solution of a problem attributed to the Pythagoreans by Eudemus, simpler cases of which we have already met with (see HERMATHENA, vol. iii., pp. 181, 196, 197; and vol. iv., p. 199, *et sq.*). On the other hand, it should be noticed—1° that we do not know when the description of a curve by points was first made; 2° that the second projection, which is a hyperbola, was obtained later by Menaechmus as a section of the cone; 3° and, lastly, that the names of the conic sections—*parabola*, *hyperbola*, and *ellipse*—derived from the problems concerning the *application*, *excess*, and *defect* of areas, were first given to them by Apollonius.⁴⁹

Several authors give Archytas credit for a knowledge of the geometry of space, which was quite exceptional and remarkable at that time, and they notice the peculiarity of his making use of a curve of double curvature—the first, as far as we know, conceived by any geometer; but no one, I believe, has pointed out the importance of the conceptions and method of Archytas in relation to

⁴⁸ 'La recherche des projections sur les plans donnés des intersections deux à deux des surfaces auxiliaires est, à cet égard, si naturelles que, si l'on peut s'étonner d'une chose, c'est précisément qu' Archytas ait conservé à sa solution une forme purement theo-

rique.' P. Tannery, *loc. cit.* p. 279.

⁴⁹ See HERMATHENA, vol. iii. p. 181, and n. 61: see, also, Apollonii *Conica*, ed. Halleius, p. 9, also pp. 31, 33, 35; and Pappi *Collect.*, ed. Hultsch, vol. ii. p. 674; and Procli *Comm.*, ed. Friedlein, p. 419.

the invention of the conic sections, and the filiation of ideas seems to me to have been completely overlooked.

Bretschneider, not bearing in mind what Simplicius tells us of Eudemus's concise proofs, thinks that this solution, though faithfully transmitted, may have been somewhat abbreviated. He thinks, too, that it must belong to the later age of Archytas—a long time after the opening of the Academy—inasmuch as the discussion of sections of solids by planes, and of their intersections with each other, must have made some progress before a geometer could have hit upon such a solution as this; and also because such a solution was, no doubt, possible only when Analysis was substituted for Synthesis.⁵⁰

Bretschneider even attempts to detect the particular analysis by which Archytas arrived at his solution, and, as Cantor thinks, with tolerable success.⁵¹ The latter reason goes on the assumption, current since Montucla, that Plato was the inventor of the method of geometrical analysis—an assumption which is based on the following passages in Diogenes Laertius and Proclus:—

He [Plato] first taught Leodamas of Thasos the analytic method of inquiry.⁵²

Methods are also handed down, of which the best is that through analysis, which brings back what is required to some admitted principle, and which Plato, as they say, transmitted to Leodamas, who is reported to have become thereby the discoverer of many geometrical theorems.⁵³

⁵⁰ Bretsch. *Geom. vor Eukl.*, pp. 151, 152.

⁵¹ Cantor, *Geschichte der Mathematik*, p. 198.

⁵² καὶ πρῶτος τὸν κατὰ τὴν ἀνάλυσιν τῆς ζητήσεως τρόπον εἰσηγήσατο Λεωδάμαντι τῷ θασίῳ. Diog. Laert. iii. 24, ed. Cobet, p. 74.

⁵³ Μέθοδοι δὲ ὅμως παραδίδονται καλλίστη μὲν ἢ διὰ τῆς ἀναλύσεως ἐπ' ἀρχὴν ὁμολογουμένην ἀνάγουσα τὸ ζητούμενον, ἣν καὶ ὁ Πλάτων, ὡς φασι, Λεωδάμαντι παρέδωκεν. ἀφ' ἧς καὶ ἐκεῖνος πολλῶν κατὰ γεωμετρίαν εὐρετῆς ἰστέρηται γενέσθαι. — Procl. *Comm.*, ed. Fried., p. 211.

Some authors, on the other hand, think, and as it seems to me with justice, that these passages prove nothing more than that Plato communicated to Leodamas of Thasos this method of analysis with which he had become acquainted, most probably, in Cyrene and Italy.⁵⁴ It is to be remembered that Plato—who in mathematics seems to have been painstaking rather than inventive—has not treated of this method in any of his numerous writings, nor is he reported to have made any discoveries by means of it as Leodamas and Eudoxus are said to have done, and as we know Archytas and Menaechmus did. Indeed we have only to compare the solution attributed to Plato of the problem of finding two mean proportionals—which must be regarded as purely mechanical, inasmuch as the geometrical theorem on which it is based is met with in the solution of Archytas—with the highly rational solutions of the same problem by Archytas and Menaechmus, to see the wide interval between them and him in a mathematical point of view. Plato, moreover, was the pupil of Socrates, who held such mean views of geometry as to say that it might be cultivated only so far as that a person might be able to distribute and accept a piece of land by measure.⁵⁵ We know that Plato, after his master's death, went to Cyrene to learn geometry from Theodorus, and then to the Pythagoreans in Italy. Is it likely, then, that Plato, who, as far as we know, never solved a geometrical question, should have invented this method of solving problems in geometry

⁵⁴ J. J. de Gelder quotes these passages of Diogenes Laertius and Proclus, and adds: 'Haec satis testantur doctissimum Montucla methodi analyticae inventionem perperam Platoni tribuere. Bruckerum rectius scripsisse existimo; scilicet eos, qui Platonem hanc methodum invenisse volunt, non cogitare, illum audivisse Theodorum Cyrenaeum,

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celeberrimum Geometram, quem hanc rationem reducendi quaestiones ad sua principia ignoravisse, non vero simile est (Bruckeri, *Hist. Crit. Phil.*, tom. 1. p. 642)'—De Gelder, *Theonis Smyrnaei Arithm.*, Praemonenda, p. xlix. Lugd. Bat.

⁵⁵ Xenophon, *Memorab.*, iv. 7; Diog. Laert., ii. 32, p. 41, ed. Cobet.

and taught it to Archytas, who was probably his teacher, and who certainly was the foremost geometer of that time, and that thereby Archytas was led to his celebrated solution of the Delian problem ?

The former of the two reasons advanced by Bretschneider, and given above, has reference to and is based upon the following well-known and remarkable passage of the *Republic* of Plato. The question under consideration is the order in which the sciences should be studied : having placed arithmetic first and geometry—*i. e.* the geometry of plane surfaces—second, and having proposed to make astronomy the third, he stops and proceeds :—

“ ‘Then take a step backward, for we have gone wrong in the order of the sciences.’

‘What was the mistake ?’ he said.

‘After plane geometry,’ I said, ‘we took solids in revolution, instead of taking solids in themselves ; whereas after the second dimension the third, which is concerned with cubes and dimensions of depth, ought to have followed.’

‘That is true, Socrates ; but these subjects seem to be as yet hardly explored.’

‘Why, yes,’ I said, ‘and for two reasons : in the first place, no government patronises them, which leads to a want of energy in the study of them, and they are difficult ; in the second place, students cannot learn them unless they have a teacher. But then a teacher is hardly to be found ; and even if one could be found, as matters now stand, the students of these subjects, who are very conceited, would not mind him. That, however, would be otherwise if the whole State patronised and honoured this science ; then they would listen, and there would be continuous and earnest search, and discoveries would be made ; since even now, disregarded as these studies are

by the world, and maimed of their fair proportions, and although none of their votaries can tell the use of them, still they force their way by their natural charm, and very likely they may emerge into light.'

'Yes,' he said, 'there is a remarkable charm in them. But I do not clearly understand the change in the order. First you began with a geometry of plane surfaces?'

'Yes,' I said.

'And you placed astronomy next, and then you made a step backward?'

'Yes,' I said, 'the more haste the less speed; the ludicrous state of solid geometry made me pass over this branch and go on to astronomy, or motion of solids.'

'True,' he said.

'Then regarding the science now omitted as supplied, if only encouraged by the State, let us go on to astronomy.'

'That is the natural order,' he said."⁶⁶

Cantor, too, says that 'stereometry proper, notwithstanding the knowledge of the regular solids, seems on the whole to have been yet [at the time of Plato] in a very backward state,'⁶⁷ and in confirmation of his opinion quotes part of a passage from the *Laws*.⁶⁸ This passage is very important in many respects, and will be considered later. It will be seen, however, on reading it to the end, that the ignorance of the Hellenes referred to by Plato, and denounced by him in such strong language, is an ignorance—not, as Cantor thinks, of stereometry—but of incommensurables.

We do not know the date of the *Republic*, nor that of the discovery of the cubature of the pyramid by Eudoxus,

⁶⁶ Plato, *Rep.* vii. 528; Jowett, *The Dialogues of Plato*, vol. ii. pp. 363, 364.

tik, p. 193.
⁶⁸ Plato, *Leges*, vii. 819, 820; Jowett, *The Dialogues of Plato*, vol. iv. pp. 333, 334.

⁶⁷ Cantor, *Geschichte der Mathema-*

which founded stereometry,⁵⁹ and which was an important advance in the direction indicated in the passage given above: it is probable, however, that Plato had heard from his Pythagorean teachers of this desideratum; and I have, in the second part of this Paper (HERMATHENA, vol. iv., pp. 213, *et seq.*), pointed out a problem of high philosophical importance to the Pythagoreans at that time, which required for its solution a knowledge of stereometry. Further, the investigation given above shows, as Cantor remarks, that Archytas formed an honourable exception to the general ignorance of geometry of three dimensions complained of by Plato. It is noteworthy that this difficult problem—the cubature of the pyramid—was solved, not through the encouragement of any State, as suggested by Plato, but, and in Plato's own lifetime, by a solitary thinker—the great man whose important services to geometry we have now to consider.

V.

Eudoxus of Cnidus⁶⁰—astronomer, geometer, physician, lawgiver—was born about 407 B.C., and was a pupil of Archytas in geometry, and of Philistion, the Sicilian [or Italian Locrian], in medicine, as Callimachus relates in his *Tablets*. Sotion in his *Successions*, moreover, says that he also heard Plato; for when he was twenty-three years of

⁵⁹ It should be noticed, however, that with the Greeks, *Stereometry* had the wider signification of geometry of three dimensions, as may be seen from the following passage in Proclus: ἡ μὲν γεωμετρία διαμερεῖται πάλιν εἰς τὴν ἐπίπεδον θεωρίαν καὶ τὴν στερεο-

μετρίαν.—Procli *Comm.*, ed. Fried., p. 39: see also *ibid.*, pp. 73, 116.

⁶⁰ Diog. Laert., viii. c. 8; A. Boeckh, *Ueber die vierjährigen Sonnenkreise der Alten, vorzüglich den Eudoxischen*, Berlin, 1863.

age and in narrow circumstances, he was attracted by the reputation of the Socratic school, and, in company with Theomedon the physician, by whom he was supported, he went to Athens, where—or rather at Piræus—he remained two months, going each day to the city to hear the lectures of the Sophists, Plato being one of them, by whom, however, he was coldly received. He then returned home, and, being again aided by the contributions of his friends, he set sail for Egypt with Chrysippus—also a physician, and who, as well as Eudoxus, learnt medicine from Philistion—bearing with him letters of recommendation from Agesilaus to Nectanabis, by whom he was commended to the priests. When he was in Egypt with Chonuphis of Heliopolis, Apis licked his garment, whereupon the priests said that he would be illustrious (ἐνδοξον), but short-lived.⁶¹ He remained in Egypt one year and four months, and composed the *Octaëteris*⁶²—an octennial period. Eudoxus then—his years of study and travel now over—took up his abode at Cyzicus, where he founded a school (which became famous in geometry and astronomy), teaching there and in the neighbouring cities of the Propontis; he also went to Mausolus. Subsequently, at the height of his reputation, he returned to Athens, accompanied by a great

⁶¹ Boeckh thinks, and advances weighty reasons for his opinion, that the voyage of Eudoxus to Egypt took place when he was still young—that is, about 378 B. C.; and not in 362 B. C., in which year it is placed by Letronne and others. Boeckh shows that it is probable that the letters of recommendation from Agesilaus to Nectanabis, which Eudoxus took with him, were of a much earlier date than the military expedition of Agesilaus to Egypt. In this view Grote agrees. See Boeckh, *Sonnenkreise*, pp. 140-148; Grote,

Plato, vol. i., pp. 120-124.

⁶² The *Octaëteris* was an intercalary cycle of eight years, which was formed with the object of establishing a correspondence between the revolutions of the sun and moon; eight lunar years of 354 days, together with three months of 30 days each, make up 2922 days: this is precisely the number of days in eight years of 365½ days each. This period, therefore, presupposes a knowledge of the true length of the solar year: its invention, however, is attributed by Censorinus to Cleostratus.

many pupils, for the sake, as some say, of annoying Plato, because formerly he had not held him worthy of attention. Some say that, on one occasion, when Plato gave an entertainment, Eudoxus, as there were many guests, introduced the fashion of sitting in a semicircle.⁶³ Aristotle tells us that Eudoxus thought that pleasure was the *summum bonum*; and, though dissenting from his theory, he praises Eudoxus in a manner which with him is quite unusual:— ‘And his words were believed, more from the excellence of his character than for themselves; for he had the reputation of being singularly virtuous, σῶφρων: it therefore seemed that he did not hold this language as being a friend to pleasure, but that the case really was so.’⁶⁴ On his return to his own country he was received with great honours—as is manifest, Diogenes Laertius adds, from the decree passed concerning him—and gave laws to his fellow-citizens; he also wrote treatises on astronomy and geometry, and some other important works. He was accounted most illustrious by the Greeks, and instead of Eudoxus they used to call him Endoxus, on account of the brilliancy of his fame. He died in the fifty-third year of his age, *circ.* 354 B. C.

The above account of the life of Eudoxus, with the exception of the reference to Aristotle, is handed down by Diogenes Laertius, and rests on good authorities.⁶⁵ Unfortunately, some circumstances in it are left undetermined as to the time of their occurrence. I have endeavoured to present the events in what seems to me to be their natural

⁶³ Is this the foundation of the statement in Grote's *Plato*, vol. i., p. 124—‘the two then became friends’?

⁶⁴ Aristot. *Eth. Nic.*, x. 2, p. 1172, ed. Bek.

⁶⁵ Callimachus of Cyrene; he was invited by Ptolemy II. Philadelphus, to a place in the Museum; and was chief

librarian of the library of Alexandria; he held this office from about 250 B. C. until his death, about 240 B. C. Her-mippus of Smyrna. Sotion of Alexandria flourished at the close of the third century B. C. Apollodorus of Athens flourished about the year 143 B. C.—Smith's *Dictionary*.

sequence. I regret, however, that in a few particulars as to their sequence I am obliged to differ from Boeckh, who has done so much to give a just view of the life and career of Eudoxus, and of the importance of his work, and of the high character of the school founded by him at Cyzicus. Boeckh thinks it likely that Eudoxus heard Archytas in geometry, and Philistion in medicine, in the interval between his Egyptian journey and his abode at Cyzicus.⁶⁶

Grote, too, in the notice which he gives of Eudoxus, takes the same view. He says:—‘Eudoxus was born in poor circumstances; but so marked was his early promise, that some of the medical school at Knidus assisted him to prosecute his studies—to visit Athens, and hear the Sophists, Plato among them—to visit Egypt, Tarentum (where he studied geometry with Archytas), and Sicily (where he studied *τὰ ἱατρικὰ* with Philistion). These facts depend upon the *Πίνακες* of Kallimachus, which are good authority’ (Diog. L. viii. 86).⁶⁷

Now I think it is much more likely that, as narrated above, Eudoxus went in his youth from Cnidus to Tarentum—between which cities, as we have seen, an old commercial intercourse existed⁶⁸—and there studied geometry under Archytas, and that he then studied medicine under the Sicilian [or Italian Locrian] Philistion. In support of this view, it is to be observed that—

1°. The narrative of Diogenes Laertius commences with this statement, which rests on Callimachus, who is good authority;

2°. The life of Eudoxus is given by Diogenes Laertius in his eighth book, which is devoted exclusively to the Pythagorean philosophers: this could scarcely have been so, if he was over thirty years of age when he heard Archytas, and that, too, only casually, as some think;

⁶⁶ Boeckh, *Sonnenkreise*, p. 149.

⁶⁸ HERMATHENA, vol. iii. p. 175:

⁶⁷ Grote, *Plato*, vol. i. p. 123, n.

Herod., iii. 138.

3°. The statement that he went from Tarentum to Sicily [or the Italian Locri] to hear Philistion, who probably was a Pythagorean—for we know that medicine was cultivated by the Pythagoreans—is in itself credible;

4°. Chrysippus, the physician in whose company Eudoxus travelled to Egypt, was also a pupil of Philistion in medicine, and Theomedon, with whom Eudoxus went to Athens, was a physician likewise; in this way might arise the relation between Eudoxus and some of the medical school of Cnidus noticed by Grote.

The statement of Grote, that 'these facts depend on the Πίνακες of Kallimachus,' is not correct; nor is there any authority for his statement that Eudoxus was assisted by the medical school of Cnidus to visit Tarentum and Sicily: the probability is that he became acquainted with some physicians of Cnidus as fellow-pupils of Philistion.

The geometrical works of Eudoxus have unfortunately been lost; and only the following brief notices of them have come down to us:—

(a). Eudoxus of Cnidus, a little younger than Leon, and a companion of Plato's pupils, in the first place, increased the number of general theorems, added three proportions to the three already existing, and also developed further the things begun by Plato concerning the section [of a line], making use, for the purpose, of the analytical method;⁶⁹

(b). The discovery of the three later proportions, referred to by Eudemus in the passage just quoted, is attributed by Iamblichus to Hippasus, Archytas, and Eudoxus;⁷⁰

(c). Proclus tells us that Euclid collected the elements, and arranged much of what Eudoxus had discovered.⁷¹

⁶⁹ Procl. *Comm.*, ed. Fried., p. 67: nulus, pp. 142, 159, 163.
see HERMATHENA, vol. iii. p. 163.

⁷¹ Procl. *Comm.*, ed. Fried., p. 68:

⁷⁰ Iambl. in *Nic. Arithm.*, ed. Ten- see HERMATHENA, vol. iii. p. 164.

(*d*). We learn further from an anonymous scholium on the Elements of Euclid, which Knoche attributes to Proclus, that the fifth book, which treats of proportion, is common to geometry, arithmetic, music, and, in a word, to all mathematical science; and that this book is said to be the invention of Eudoxus (Εὐδόξου τινὸς τοῦ Πλάτωνος διδασκάλου);⁷³

(*e*). Diogenes Laertius tells us, on the authority of the Chronicles of Apollodorus, that Eudoxus was the discoverer of the theory of curved lines (εὐρεῖν τε τὰ περὶ τὰς καμπύλας γραμμάς);⁷⁴

(*f*). Eratosthenes says, in the passage quoted above, that Eudoxus employed these so-called curved lines to solve the problem of finding two mean proportionals between two given lines;⁷⁵ and in the epigram which concludes his letter to Ptolemy III., Eratosthenes associates him with Archytas and Menaechmus;⁷⁶

(*g*). In the history of the 'Delian Problem' given by Plutarch, Plato is stated to have referred the Delians, who implored his aid, to Eudoxus of Cnidus, or to Helicon of Cyzicus, for its solution;⁷⁷

(*h*). We learn from Seneca that Eudoxus first brought back with him from Egypt the knowledge of the motions of the planets;⁷⁸ and from Simplicius, on the authority of Eudemus, that, in order to explain these motions, and in particular the retrograde and stationary appearances of the planets, Eudoxus conceived a certain curve, which he called the *hippopede*;⁷⁹

⁷³ Euclid's *Elem.*, ed. August., vol. ii. p. 328; Knoche, *Untersuchungen*, &c., p. 10: see HERMATHENA, vol. iii. p. 204.

⁷⁴ Diog. Laert., viii. c. 8, ed. Cobet, p. 226.

⁷⁵ Archim., ed. Torelli, p. 144; ed. Heiberg., iii. p. 106.

⁷⁶ Archim., ed. Tor., p. 146; ed.

Heib., iii. p. 112. Some writers translate θεοῦδότης in this epigram by 'divine,' but the true sense seems to be 'God-fearing, pious': see Arist., p. 214, *sup*.

⁷⁷ Plutarch, *de Gen. Soc.* 1, *Opera*, ed. Didot, vol. iii. p. 699.

⁷⁸ Seneca, *Quaest. Nat.*, vii. 3.

⁷⁹ Brandis, *Scholia in Aristot.*, p. 500, *a*.

(i). Archimedes tells us expressly that Eudoxus discovered the following theorems:—

Any pyramid is the third part of a prism which has the same base and the same altitude as the pyramid;

Any cone is the third part of a cylinder which has the same base and the same altitude as the cone.⁷⁹

(j'). Archimedes, moreover, points out the way in which these theorems were discovered: he tells us that he himself obtained the quadrature of the parabola by means of the following lemma:—‘If two spaces are unequal, it is possible to add their difference to itself so often that every finite space can be surpassed. Former geometers have also used this lemma; for, by making use of it, they proved that circles have to each other the duplicate ratio of their diameters, and that spheres have to each other the triplicate ratio of their diameters; further, that any pyramid is the third part of a prism which has the same base and the same altitude as the pyramid; and that any cone is the third part of a cylinder which has the same base and the same altitude as the cone.’⁸⁰

Archimedes, moreover, enunciates the same lemma for lines and for volumes, as well as for surfaces.⁸¹ And the fourth definition of the fifth book of Euclid—which book, we have seen, has been ascribed to Eudoxus—is somewhat similar.⁸² It should be observed that Archimedes

⁷⁹ Archim., ed. Torelli, p. 64; ed. Heib., vol. i. p. 4.

⁸⁰ Archim., ed. Tor., p. 18; ed. Heib., vol. ii. p. 296.

⁸¹ Ἐτι δὲ τῶν ἀνίσων γραμμῶν καὶ τῶν ἀνίσων ἐπιφανειῶν καὶ τῶν ἀνίσων στερεῶν τὸ μείζον τοῦ ἐλάσσονος ὑπερέχειν τοιοῦτον, ὃ συντιθέμενον αὐτὸ ἐαυτῷ δυ-

νατόν ἐστιν ὑπερέχειν παντὸς τοῦ προστεθέντος τῶν πρὸς ἄλληλα λεγομένων. Archim., ed. Tor., p. 65; ed. Heib., vol. i. p. 10.

⁸² This definition is—

Λόγον ἔχειν πρὸς ἄλληλα μεγέθη λέγεται, ἃ δύναται πολλαπλασιαζόμενα ἀλλήλων ὑπερέχειν.

does not say that the lemma used by former geometers was exactly the same as his, but like it : his words are :—*ὁμοίον τῷ προειρημένῳ λήμμά τι λαμβάνοντες ἔγραφον*.

Concerning the three new proportions referred to in (a) and (δ), see the first part of this Paper (HERMATHENA, vol. iii., pp. 200, 201). In Proclus they are ascribed to Eudoxus ; whereas Iamblichus reports that they are the invention of Archytas and Hippiasus, and says that Eudoxus and his school (*οἱ περὶ Εὐδόξου μαθηματικοί*) only changed their names. The explanation of these conflicting statements, as Bretschneider has suggested, probably lies in this—that Eudoxus, as pupil of Archytas, learned these proportions from his teacher, and first brought them to Greece, and that later writers then believed him to have been the inventor of them.⁸³

For additional information on this subject, and with relation to the further development of this doctrine by later Greek mathematicians, who added four more means to the six existing at this period, the reader is referred to Pappus, Nicomachus, Iamblichus, and also to the observations of Cantor with relation to them.⁸⁴

The passage (a) concerning the section (*περὶ τὴν τομήν*) was for a long time regarded as extremely obscure : it was explained by Bretschneider as meaning the section of a straight line in extreme and mean ratio, *sectio aurea*, and in the first part of this Paper (HERMATHENA, vol. iii., p. 163, note) I adopted this explanation. Bretschneider's interpretation has since been followed by Cantor in his classical work on the *History of Mathematics*,⁸⁵ and may now be regarded as generally accepted.

A proportion contains in general four terms ; the second and third terms may, however, be equal, and then three

⁸³ Bretsch. *Geom. vor Eukl.* p. 164.

p. 70. Cantor, *Gesch. der Math.* p. 206.

⁸⁴ Pappi *Collect.*, ed. Hultsch, vol. i.

⁸⁵ *Ibid.* p. 208.

magnitudes only are concerned : further, if the magnitudes are *lines*, the third term may be the difference between the first and second, and thus the geometrical and arithmetical ratios may occur in the same proportion : the greatest line is then the sum of the two others, and is said to be cut in extreme and mean ratio. The construction of the regular pentagon depends ultimately on this section—which Kepler says was called *sectio aurea*, *sectio divina*, and *proportio divina*, on account of its many wonderful properties. This problem, to cut a given straight line in extreme and mean ratio, is solved in Euclid ii. 11, and vi. 30 ; and the solution depends on the application of areas, which Eudemus tells us was an invention of the Pythagoreans. Use is made of the problem in Euclid iv. 10–14 ; and the subject is again taken up in the Thirteenth Book of the Elements.

Bretschneider observes that the first five propositions of this book are treated there in connexion with the analytical method, which is nowhere else mentioned by Euclid ; and infers, therefore, that these theorems are the property of Eudoxus.⁸⁶ Cantor repeats this observation of Bretschneider, and thinks that there is much probability in the supposition that these five theorems are due to Eudoxus, and have been piously preserved by Euclid.⁸⁷ Heiberg, in a notice of Cantor's *Vorlesungen über Geschichte der Mathematik*, already referred to, has pointed out that these analyses and syntheses proceed from a scholiast:⁸⁸ the reasoning of Bretschneider and Cantor is, therefore, not conclusive.

⁸⁶ Bretsch., *Geom. vor Eukl.* p. 168.

⁸⁷ Cantor, *Gesch. der Math.*, p. 208.

⁸⁸ *Rev. Crit.*, &c., 16 Mai, 1881, p. 380. 'P. 189 et surtout, p. 236, M. C. paraît accepter pour authentiques les synthèses et analyses insérées dans les

éléments d'Euclide (xiii. 1–5). Elles proviennent d'un scholiaste, ce qui ressort, d'ailleurs, de ce que, dans les manuscrits, elles se trouvent tantôt juxtaposées aux thèses une à une, tantôt réunies après le chap. xiii. 5.'

There is, however, I think, internal evidence to show that these five propositions are older than Euclid, for—

1. The demonstrations of the first four of these theorems depend on the dissection of areas, and use is made in them of the gnomon—an indication, it seems to me, of their antiquity.

2. The first and fifth of these theorems can be obtained at once from the solution of Euclid ii. 11; and of these two theorems the third is an immediate consequence; the solution, therefore, of this problem given in Book ii. must be of later date.

These theorems, then, regard being had to the passage of Proclus quoted above, may, as Bretschneider and Cantor think, be due to Eudoxus; it appears to me, however, to be more probable that the theorems have come down from an older time; but that the definitions of analysis and synthesis given there, and also the *ἄλλως* (or *aliter* proofs), in which the analytical method is used, are the work of Eudoxus.⁸⁹

As most of the editions of the Elements do not contain the Thirteenth Book, I give here the enunciations of the first five propositions:—

PROP. I. If a straight line be cut in extreme and mean ratio, the square on the greater segment, increased by half of the whole line, is equal to five times the square of half of the whole line.

PROP. II. If the square on a straight line is equal to five times the square on one of its segments, and if the

⁸⁹ I have since learned that Dr. Heiberg takes the same view; he thinks that Cantor's supposition—or rather, as he should have said, Bretschneider's—

that these definitions are due to Eudoxus is probable. *Zeitschrift für Math. und Phys.*, p. 20; 29. Jahrgang, 1. Heft. 30 Dec. 1883.

double of this segment is cut in extreme and mean ratio, the greater segment is the remaining part of the straight line first proposed.

PROP. III. If a straight line is cut in extreme and mean ratio, the square on the lesser segment, increased by half the greater segment, is equal to five times the square on half the greater segment.

PROP. IV. If a straight line is cut in extreme and mean ratio, the squares on the whole line and on the lesser segment, taken together, are equal to three times the square on the greater segment.

PROP. V. If a straight line is cut in extreme and mean ratio, and if there be added to it a line equal to the greater segment, the whole line will be cut in extreme and mean ratio, and the greater segment will be the line first proposed.

From the last of these propositions it follows that, if a line be cut in extreme and mean ratio, the greater segment will be cut in a similar manner by taking on it a part equal to the less; and so on continually; and it results from Prop. III. that twice the lesser segment exceeds the greater. If now reference be made to the Tenth Book, which treats of incommensurable magnitudes, we find that the first proposition is as follows:—‘Two unequal magnitudes being given, if from the greater a part be taken away which is greater than its half, and if from the remainder a part greater than its half, and so on, there will remain a certain magnitude which will be less than the lesser given magnitude’; and that the second proposition is—‘Two unequal magnitudes being proposed, if the lesser be continually taken away from the greater, and if the remainder never measures the preceding remainder, these

magnitudes will be incommensurable'; lastly, in the third proposition we have the method of finding the greatest common measure of two given commensurable magnitudes. Taking these propositions together, and considering them in connexion with those in the Thirteenth Book, referred to above, it seems likely that the writer to whom the early propositions of the Tenth Book are due had in view the section of a line in extreme and mean ratio, out of which problem I have expressed the opinion that the discovery of incommensurable magnitudes arose (see HERMATHENA, vol. iii., p. 198).

This, I think, affords an explanation of the place occupied by Eucl. x. 1 in the Elements, which would otherwise be difficult to account for: we might rather expect to find it at the head of Book xii., since it is the theorem on which the Method of Exhaustions, as given by Euclid in that book, is based, and by means of which the following theorems in it are proved:—

Circles are to each other as the squares on their diameters, xii. 2 ;

A pyramid is the third part of a prism having the same base and same height, xii. 7 ;

A cone is the third part of a cylinder having the same base and same height, xii. 10 ;

Spheres are to each other in the triplicate ratio of their diameters, xii. 18.

Now two of the foregoing theorems are attributed to Eudoxus by Archimedes; and the lemma, which Archimedes tells us former geometers used in order to prove these theorems, is substantially the same as that assumed by Euclid in the proof of the first proposition of his Tenth Book: it is probable, therefore, that this proposition also is due to Eudoxus.

Eudoxus, therefore, as I have said (HERMATHENA, vol. iv., p. 223), must be regarded as the inventor of the Method of Exhaustions. We know, too, that the doctrine of proportion, as contained in the Fifth Book of Euclid, is attributed to him. I have, moreover, said (HERMATHENA, *loc. cit.*) that 'the invention of rigorous proofs for theorems such as Euclid vi. 1, involves, in the case of incommensurable quantities, the same difficulty which is met with in proving rigorously the four theorems stated by Archimedes in connexion with this axiom.'⁹⁰ In all these cases the difficulty was got over, and rigorous proofs supplied, in the same way—namely, by showing that every supposition contrary to the existence of the properties in question led, of necessity, to some contradiction, in short by the *reductio ad absurdum*⁹¹ (ἀπαγωγή εἰς ἀδύνατον). Hence it follows that Eudoxus must have been familiar with this method of reasoning. Now this indirect kind of proof is merely a case of the Analytical Method, and is indeed the case in which the subsequent synthesis, that is usually required as a complement, may be dispensed with. In connexion with this it may be observed that the term used here ἀπαγωγή is the same that we met with (HERMATHENA, vol. iii., p. 197, n.) on our first introduction to the analytical me-

⁹⁰ 'C'était encore par la réduction à l'absurde que les anciens étendaient aux quantités incommensurables les rapports qu'ils avaient découverts entre les quantités commensurables' (Carnot, *Réflexions sur la Méthaphysique du Calcul Infinitésimal*, p. 137, second edition: Paris, 1813).

If the bases of the triangles are commensurable, this theorem, Euclid vi. 1, can be proved by means of the First Book and the Seventh Book, which

latter contains the theory of proportion for numbers and for commensurable magnitudes. It is easy to see, then, that this theorem can be proved in a general manner—so as to include the case where the bases are incommensurable—by the method of *reductio ad absurdum* by means of the axiom used in Euclid x. 1, which has been attributed above to Eudoxus: see pp. 218 and 223.

⁹¹ Carnot, *ibid.*, p. 135.

thod; this indeed is natural, for analysis, as Duhamel remarked, is nothing else but a method of reduction."⁸²

Eutocius, in his Commentary on the treatise of Archimedes *On the Sphere and Cylinder*, in which he has handed down the letter of Eratosthenes to Ptolemy III., and in which he has also preserved the solutions of the Delian Problem by Archytas, Menaechmus, and other eminent mathematicians, with respect to the solution of Eudoxus merely says :

‘ We have met with the writings of many illustrious men, in which the solution of this problem is professed; we have declined, however, to report that of Eudoxus, since he says in the introduction that he has found it by means of curved lines, *καμπύλων γραμμῶν* : in the proof, however, he not only does not make any use of these curved lines, but also, finding a discrete proportion, takes it as a continuous one; which was an absurd thing to conceive—not merely for Eudoxus, but for those who had to do with geometry in a very ordinary way.’⁸³

As Eutocius omitted to transmit the solution of Eudoxus, so I did not give the above with the other notices of his geometrical work. It is quite unnecessary to defend Eudoxus from either of the charges contained in this passage. I will only remark, with Bretschneider, that it is strange that Eutocius, who had before him the letter of Eratosthenes, did not recognise in the complete corruption of the text the source of the defects which he blames.⁸⁴

We have no further notice of these so-called curved lines : it is evident, however, that they could not have been any of the conic sections, which were only discovered later by Menaechmus, the pupil of Eudoxus.

⁸² ‘ L’analyse n’est donc autre chose qu’une méthode de *réduction* ’ (Duhamel, *Des Méthodes dans les Sciences de Raisonnement*, Première Partie,

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p. 41).

⁸³ Archim. ed. Tor., p. 135, ed. Heiberg, vol. iii. p. 66.

⁸⁴ Bretsch. *Geom. vor Eukl.* p. 166.

There is a conjecture, however, concerning them, which is worth noticing: M. P. Tannery thinks that the term *καμπύλαι γραμμαὶ* has, in the text of Eratosthenes, a particular signification, and that, compared with, *e. g.* the *καμπύλα τόξα* of Homer, it suggests the idea of a curve symmetrical to an axis, which it cuts at right angles, and presenting an inflexion on each side of this axis. Tannery conjectures that these curves of Eudoxus are to be found amongst the projections of the curves used in the solution of his master, Archytas; and tries to find whether, amongst these projections, any can be found to which the denomination in question can be suitably applied. We have seen above, p. 204, that Flauti has shown how the solution of Archytas could be constructed by means of the projections, on one of the vertical planes, of the curves employed in that solution. I have further shown that the actual construction of these projections can be obtained by the aid of geometrical theorems and problems known at the time of Archytas; though we have no evidence that he completed his solution in this way. Tannery has considered these curves, and shown that the term *κ. γ.*, in the sense which he attaches to it, does not apply to either of them, nor to the projections on the other vertical plane; but that, on the contrary, the term is quite applicable to the projection of the intersection of the cone and tore on the circular base of the cylinder.⁹⁵

The astronomical work of Eudoxus is beyond the scope of this Paper, and is only referred to in connexion with the *hippopede* (*h*). I may briefly state, however, that he was a practical observer, and that he 'may be considered as the father of scientific astronomical observation in Greece'; further, that 'he was the first Greek astronomer who devised a systematic theory for explaining the periodic

⁹⁵ Tannery, *Sur les Solutions du Problème de Dédos par Archytas et par Eudoxe*.

motions of the planets';⁹⁶ that he did so by means of geometrical hypotheses, which later were submitted to the test of observations, and corrected thereby; and that hence arose the system of concentric spheres which made the name of Eudoxus so illustrious amongst the ancients.

Although this theory was substantially geometrical, and is in the highest degree worthy of the attention of the students of the history of geometry, yet to render an account of it which would be in the least degree satisfactory would altogether exceed the limits prescribed to me; I must, therefore, refer my readers to the excellent and memorable monograph⁹⁷ of Schiaparelli, who with great ability and with rare felicity has restored the work of Eudoxus. In this memoir the nature of the spherical curve, called by Eudoxus the *hippopede*, was first placed in a clear light: it is the intersection of a sphere and cylinder; and on account of its form, which resembles the figure 8, it is called by Schiaparelli a *spherical lemniscate*.⁹⁸ A passage in Xenophon, *De re equestri*, cap. 7, explains why the name *hippopede* was given to this curve, and also to one of the *spirics* (ἡ ἱπποπέδη, μὲν τῶν σπειρικῶν οὖσα)⁹⁹ of Perseus, which also has the form of a lemniscate.

I have examined the work of Eudoxus, and pointed out the important theorems discovered by him; I have also dwelt on the importance of the methods of inquiry and

⁹⁶ Sir George Cornewall Lewis, *A Historical Survey of the Astronomy of the Ancients*, p. 147, et sq.: London, 1862.

⁹⁷ G. V. Schiaparelli, *Le Sfere Omocentriche di Eudosso, di Calippo e di Aristotele* (Ulrico Hoepli: Milano, 1875).

⁹⁸ See Schiaparelli, *loc. cit.*, section v.

⁹⁹ Procl. *Comm.* ed. Fried., p. 127. With respect to the spiric lines, see Knoche and Maerker, *Ex Procli successoris in Euclidis elementa commentariis definitionis quartae expositionem quae de recta est linea et sectionibus, spiricis commentati sunt J. H. Knochius et F. J. Maerkerus*, Herfordiae, 1856.

proof which he introduced. In order to appreciate this part of his work, it seems desirable to take a brief retrospective glance at the progress of geometry as set forth in the two former parts of this Paper, and the state in which it was at the time of Eudoxus, and also to refer to the philosophical movement during the last generation of the fifth century B. C. :—

In the first part (HERMATHENA, vol. iii., p. 171) I attributed to Thales the theorem that the sides of equiangular triangles are proportional; a theorem which contains the beginnings of the doctrine of proportion and of the similarity of figures. It is agreed on all hands that these two theories were treated at length by Pythagoras and his School. It is almost certain, however, that the theorems arrived at were proved for commensurable magnitudes only, and were assumed to hold good for all. We have seen, moreover, that the discovery of incommensurable magnitudes is attributed to Pythagoras himself by Eudemus: this discovery, and the construction of the regular pentagon, which involves incommensurability, depending as it does on the section of a line in extreme and mean ratio, were always regarded as glories of the School, and kept secret; and it is remarkable that the same evil fate is said to have overtaken the person who divulged each of these secrets—secrets, too, regarded by the brotherhood as so peculiar that the pentagram, which might be taken to represent both these discoveries, was used by them as a sign of recognition. It seems to be a fair inference from what precedes, that the Pythagoreans themselves were aware that their proofs were not rigorous, and were open to serious objection: ¹⁰⁰ indeed, after the invention of dialectic

¹⁰⁰ A similar view of the subject is taken by P. Tannery, *De la solution géométrique des problèmes du second degré avant Euclide*. Mémoires de la

Société des Sciences physiques et naturelles de Bordeaux, t. iv. (2^e série), p. 406. He says:—'La découverte de l'incommensurabilité de certaines lon-

tics by Zeno, and the great effect produced throughout Hellas by his novel and remarkable negative argumentation, any other supposition is not tenable. Further, it is probable that the early Pythagoreans, who were naturally intent on enlarging the boundaries of geometry, took for granted as self-evident many theorems, especially the converses of those already established. The first publication of the Pythagorean doctrines was made by Philolaus; and Democritus, who was intimate with him, and probably his pupil, wrote on incommensurables.

Meanwhile the dialectic method and the negative mode of reasoning had become more general, or, to use the words of Grote :—

‘ We thus see that along with the methodised question and answer, or dialectic method, employed from henceforward more and more in philosophical inquiries, comes out at the same time the negative tendency—the probing, testing, and scrutinising force—of Grecian speculation. The negative side of Grecian speculation stands quite as prominently marked, and occupies as large a measure of the intellectual force of their philosophers, as the positive side. It is not simply to arrive at a conclusion, sustained by a certain measure of plausible premise—and then to proclaim it as an authoritative dogma, silencing or disparaging all objectors—that Grecian speculation aspires. To unmask not only positive falsehood, but even affirmation without evidence, exaggerated confidence in what was only doubtful, and show of knowledge without the reality—to look at a problem on all sides, and set forth all the difficulties attending its solution—to take account of deductions from the affirmative evidence, even in the case of conclusions accepted as true upon the balance—all this

guez entre elles, et avant tout de la diagonale du carré à son côté, qu'elle soit due au Maître ou aux disciples, dut,

dès lors, être un véritable scandale logique, une redoutable pierre d'achoppement.’

will be found pervading the march of their greatest thinkers. As a condition of all progressive philosophy, it is not less essential that the grounds of negation should be freely exposed than the grounds of affirmation. We shall find the two going hand in hand, and the negative vein, indeed, the more impressive and characteristic of the two, from Zeno downward, in our history.¹⁰¹

As an immediate consequence of this it would follow that the truth of many theorems, which had been taken for granted as self evident, must have been questioned; and that, in particular, doubt must have been thrown on the whole theory of the similarity of figures and on all geometrical truths resting on the doctrine of proportion: indeed it might even have been asked what was the meaning of ratio as applied to incommensurables, inasmuch as their mere existence renders the arithmetical theory of proportion inexact in its very definition.¹⁰²

Now it is remarkable that the doctrine of proportion is *twice* treated in the Elements—first, in a general manner, so as to include incommensurables, in Book v., which tradition ascribes to Eudoxus, and then arithmetically in Book vii., which probably, as Hankel has supposed, contains the treatment of the subject by the older Pythagoreans.¹⁰³ The twenty-first definition of Book vii. is—'Ἀριθμοὶ ἀνάλογόν εἰσιν, ὅταν ὁ πρῶτος τοῦ δευτέρου καὶ ὁ τρίτος τοῦ τετάρτου ἰσάκῃς ἢ πολλαπλάσιος, ἢ τὸ αὐτὸ μέρος, ἢ τὰ αὐτὰ μέρη.

Further, if we compare this definition with the third, fourth, and fifth definitions of Book v., I think we can see evidence of a gradual change in the idea of ratio, and of a development of the doctrine of proportion—

1. The third definition, which is generally considered

¹⁰¹ Grote, *History of Greece*, vol. vi. p. 48.

and *Ratio* in the English Cyclopaedia.

¹⁰² See the Articles on *Proportion*

¹⁰³ Hankel, *Gesch. der Math.*, p. 390.

not to belong to Euclid,¹⁰⁴ seems to be an attempt to bridge over the difficulty which is inherent in incommensurables, and may be a survival of the manner in which the subject was treated by Democritus.

2. The fourth definition is generally regarded as having for its object the exclusion of the ratios of finite magnitudes to magnitudes which are infinitely great on the one side, and infinitely small on the other: it seems to me, however, that its object may have been, rather, to include the ratios of incommensurable magnitudes; moreover, since the doctrine of proportion by means of the apagogic method of proof can be founded on the axiom which is connected with this definition, and which is the basis of the *method of exhaustions*, it is possible that the subject may have been first presented in this manner by Eudoxus.

3. Lastly, in the fifth definition his final and systematic manner of treating the subject is given.¹⁰⁵

Those who are acquainted with the history of Greek philosophy know that a state of things somewhat similar to that represented above existed with respect to it also, and that a problem of a similar character, also requiring a new method, proposed itself for solution towards the close of the fifth century B. C.; and, further, that this problem was solved by Socrates by means of a new philosophic method—the analysis of general conceptions. This must have been known to Eudoxus, for we are informed that he

¹⁰⁴ Λόγος ἐστὶ δύο μεγεθῶν ὁμογενῶν ἢ κατὰ πηλικότητα πρὸς ἄλληλα ποιά σχέσις. See Camerer, *Euclidis elementorum libri sex priores*, tom. ii. p. 74, *et sq.*, Berolini, 1824.

¹⁰⁵ In connexion with what precedes, we are reminded of the aphorism of Aristotle—‘We cannot prove anything by starting from a different genus, *e. g.*

nothing geometrical by means of arithmetic. . . . Where the subjects are so different as they are in arithmetic and geometry we cannot apply the arithmetical sort of proof to that which belongs to quantities in general, unless these quantities are numbers, which can only happen in certain cases.’ *Anal. post.* i. 7, p. 75, a, ed. Bek.

was attracted to Athens by the fame of the Socratic School. Now a service, similar to that rendered by Socrates to philosophy, but of higher importance, was rendered by Eudoxus to geometry, who not only completed it by the foundation of stereometry, but, by the introduction of new methods of investigation and proof, placed it on the firm basis which it has maintained ever since.

This eminent thinker—one of the most illustrious men of his age, an age so fruitful in great men, the precursor, too, of Archimedes and of Hipparchus—after having been highly estimated in antiquity,¹⁰⁶ was for centuries unduly depreciated;¹⁰⁷ and it is only within recent years that, owing to the labours of some conscientious and learned men, justice has been done to his memory, and his reputation restored to its original lustre.¹⁰⁸

Something, however, remained to be cleared up, especially with regard to his relations, and supposed obligations, to Plato.¹⁰⁹ I am convinced that the obligations were quite

¹⁰⁶ E. g. Cicero, *de Div.* ii. 42, 'Ad Chaldaeorum monstra veniamus: de quibus Eudoxus, Platonis auditor, in astrologia judicio doctissimorum hominum facile princeps, sic opinatur, id quod scriptum reliquit: Chaldaeis in praedictione et in notatione cujusque vitae ex natali die, minime esse credendum': Plutarch, *non posse suav. vivi sec. Epic.* c. xi. Εὐδόξῳ δὲ καὶ Ἀρχιμήδει καὶ Ἰππάρχῳ συνευνοοῦμεν.

¹⁰⁷ As evidence of this depreciation I may notice—Delambre, *Histoire de l'Astronomie ancienne* 'L'Astronomie n'a été cultivée véritablement qu'en Grèce, et presque uniquement par deux hommes, Hipparque et Ptolémée' (tom. i. p. 325): 'Rien ne prouve qu'il [Eudoxe] fut géomètre' (tom. i. p. 131). Well may Schiaparelli say—'Questa

enorme proposizione.' Equally monstrous is the following:—'it is only in the first capacity [astronomer and not geometer] that his fame has descended to our day, and he has more of it than can be justified by any account of his astronomical science now in existence.' De Morgan, in Smith's Dictionary.

¹⁰⁸ Ideler, *ueber Eudoxus*, Abh. der Berl. Akad. v. J. 1828 and 1830: Letronne, *sur les écrits et les travaux d'Eudoxe de Cnide, d'après M. Ludwig Ideler*, journal des Savants, 1840: Boeckh, *Sonnenkreise der Alten*, 1863: Schiaparelli, *le Sfere Omocentriche*, &c., 1875.

¹⁰⁹ Even those, by whom the fame of Eudoxus has been revived, seem to acquiesce in this.

in the opposite direction, and that Plato received from Eudoxus incomparably more than he gave. As to his solving problems proposed by Plato, the probability is that these questions were derived from the same source—Archytas and the Pythagoreans. Yet I attach the highest importance to the visit of Eudoxus to Athens; for although he heard Plato for two months only, that time was sufficient to enable Eudoxus to become acquainted with the Socratic method, to see that it was indispensable to clear up some of the fundamental conceptions of geometry, and, above all, to free astronomy from metaphysical mystifications, and to render the treatment of that science as real and positive as that of geometry. To accomplish this, however, it was incumbent on him to know the celestial phenomena, and for this purpose—inasmuch as one human life was too short—he saw the necessity of going to Egypt, to learn from the priests the facts which an observation continued during many centuries had brought to light, and which were there preserved.

I would call particular attention to the place which Eudoxus filled in the history of science—with him, in fact, an epoch closed, and a new era, still in existence, opened.¹¹⁰ He was geometer, astronomer, physician, lawgiver, and was also counted amongst the Pythagoreans, and versed in the philosophy of his time. He was, however, much

¹¹⁰ This has been pointed out by Auguste Comte:—'Celle-ci [la seconde évolution scientifique de la Grèce] commença pourtant, avec tous ses caractères propres, pendant la génération antérieure à cette ère [la fondation du Musée d'Alexandrie], chez un savant trop méconnu, qui fournit une transition normale entre ces deux grandes phases théoriques, composées chacune d'environ trois siècles. Quoique nul-

lement philosophe, Eudoxe de Cnide fut le dernier théoricien embrassant, avec un égal succès, toutes les spéculations accessibles à l'esprit mathématique. Il servit pareillement la géométrie et l'astronomie, tandis que, bientôt après lui, la spécialisation devint déjà telle que ces deux sciences ne purent plus être notablement perfectionnées par les memes organes.' *Politique Positive*, iii., p. 316, Paris, 1853.

more *the man of science*, and, of all the ancients, no one was more imbued with the true scientific and positive spirit than was Eudoxus: in evidence of this, I would point to—

1°. His work in all branches of the geometry of the day—founding new, placing old on a rational basis, and throwing light on all—as presented above.

2°. The fact that he was the first who made observation the foundation of the study of the heavens, and thus became the father of true astronomical science.

3°. His geometrical hypothesis of concentric spheres, which was conceived in the true scientific spirit, and which satisfied all the conditions of a scientific research, even according to the strict notions attached to that expression at the present day.

4°. His ‘practical and positive genius, which was averse to all idle speculations.’¹¹¹

5°. The purely scientific school founded by him at Cyzicus, and the able mathematicians who issued from that school, and who held the highest rank as geometers and astronomers in the fourth century B. C.

We see, then, in Eudoxus something quite new—the first appearance in the history of the world of the man of science; and, as in all like cases, this change was effected by a man who was thoroughly versed in the old system.¹¹²

¹¹¹ Ideler, and after him Schiaparelli: this appears from the fact testified by Cicero (*vid. supra*, n. 106), that Eudoxus had no faith in the Chaldean astrology which was then coming into fashion among the Greeks; and also from this—that he did not, like many of his predecessors and contemporaries, give expression to opinions upon things which were inaccessible to the observations and experience of the time. An

instance of this is found in Plutarch (*non posse suav. viv. sec. Epic.* cxi., vol. iv., p. 1138, ed. Didot), who relates that he, instead of speculating, as others did, on the nature of the sun, contented himself with saying that ‘he would willingly undergo the fate of Phaeton if, by so doing, he could ascertain its nature, magnitude, and form.’

¹¹² Eudoxus may even be regarded as

It is not without significance, too, that Eudoxus selected the retired and pleasant shores of the Propontis as the situation of the school which he founded for the transmission of his method. Among the first who arose in this school was Menaechmus, whose work I have next to consider.*

in a peculiar manner uniting in himself and representing the previous philosophic and scientific movement; for—though not an *Ionian*—he was a native of one of the neighbouring Do-

rian cities; he then went to study under the *Pythagoreans* in Italy; and, subsequently, he went to Athens, being attracted by the reputation of the *Socratic* school.

* [The Bibliographical Note, referred to in page 186, will be given in the next No. of HERMATHENA.]

GEORGE J. ALLMAN.



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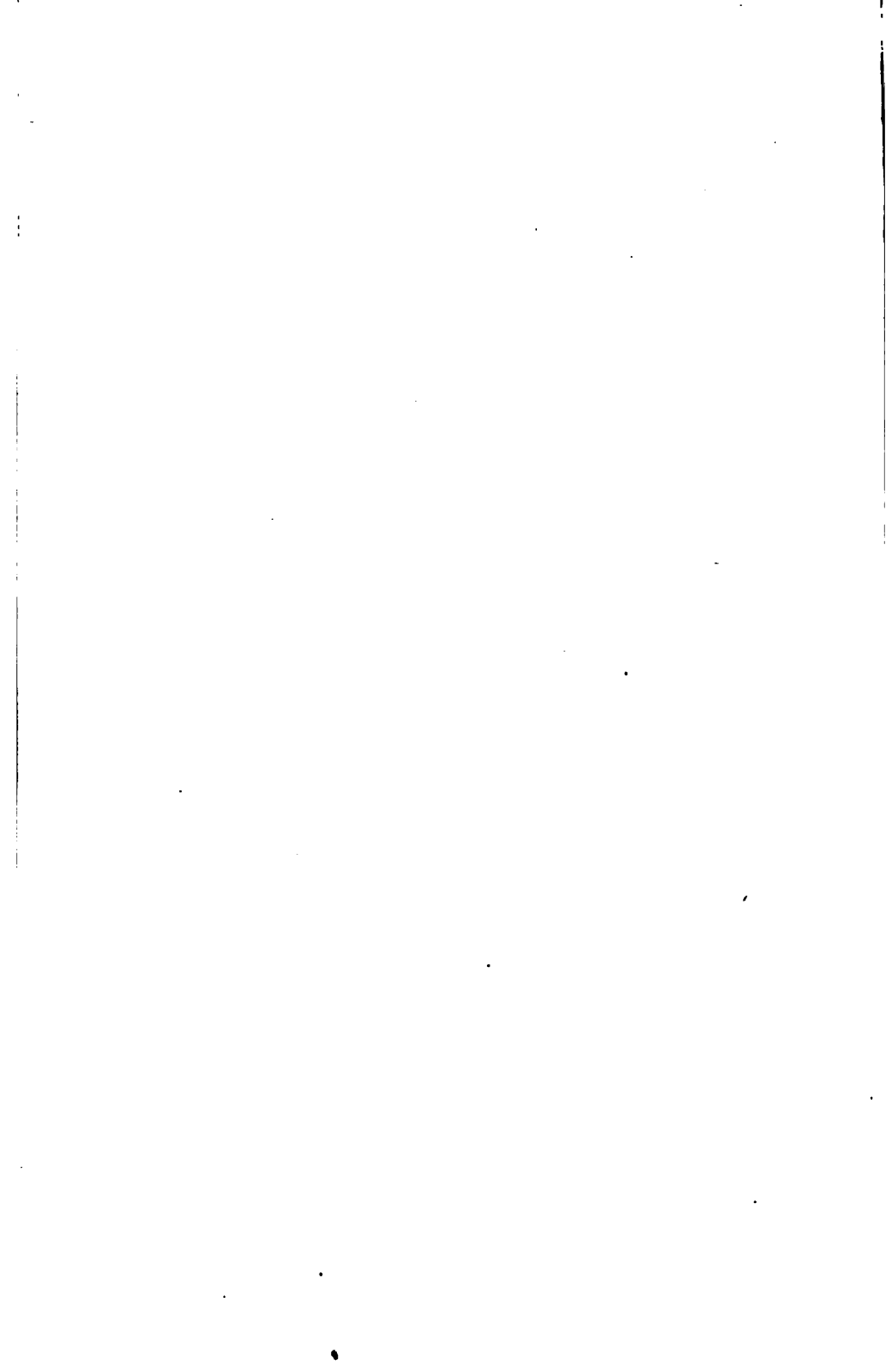


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HERMATHENA.

ON TWO FRAGMENTS OF A GREEK PAPYRUS.

IN the spring of 1882, during a residence of some weeks at Luxor, I was tempted by an Arab dealer in antiquities, who paid me frequent mysterious visits, to buy, one after another, several small parcels of papyri, which he assured me had been recently found in a tomb near Medinet Abu. They were plainly genuine. But on examining them I came to the conclusion that the seller had divided, if not actually broken them up into small lots, thinking in this way to obtain more for them than he would have realized by disposing of them in the state in which they had been found. Men of his class are in general shrewd calculators, and know how to excite and keep up the curiosity of their ordinary customers by exhibiting their wares gradually. But they sometimes overreach themselves in dealing thus with intelligent purchasers, who know the value of a well-preserved ancient document and the worthlessness of a fortuitous collection of scraps, found in different places, written at different times, and relating to different subjects.

The small bits of papyrus offered to me were hundreds in number, many of them exhibiting only two or three letters; and I judged, perhaps hastily, that they were of no great value. They appeared for the most part to be fragments of short letters in Coptic, relating to the affairs of a convent. Medinet Abu, where I was told they were

found, was the seat of a bishop : a cathedral dedicated to St. Athanasius once stood in the magnificent courtyard of the temple built there by Rameses III. ; and in its neighbourhood were two considerable monasteries, amongst the inmates of which men of learning were probably to be found. Keeping this in view, I continued to buy instalments of papyrus scraps, hoping in the end to complete a few documents, the contents of which would add to the scanty store of information we possess respecting the ecclesiastical history of Upper Egypt. I cannot say that these expectations have as yet been realized. However, in sorting these fragments, I observed that several of them were written in Greek. Setting these aside, I finally succeeded in putting them together, so as to form the two fragments which I am about to describe. As they are written on both sides of the papyrus, we have thus preserved four groups of incomplete hexameter lines.

Before the reader proceeds to compare my readings of these verses with the photographs of them which illustrate this paper, I would wish to anticipate an objection—perhaps I ought rather to say a remark—which he is likely to make. He will probably be disposed to give me more credit than I deserve for ingenuity or imagination in supplying readings where the photograph appears to afford no adequate help. I have certainly taken great pains to represent the MS. faithfully, using a magnifying glass and abundance of light, both natural and artificial, in the examination of every letter. But I am bound to say that the original is much more easily read than the photograph. This difference arises from the fact that the yellowish brown of the papyrus and the faded tint of the ink are not sufficiently different in actinic power to show how much darker the writing looks than the papyrus in places where it has been abraded or discoloured. This is particularly noticeable on the *verso* sides of the two fragments.





I read the *recto* of the first fragment as follows, the letters between brackets being supplied by conjecture :—

[E]XE MOI ΣΕΒΑΣ ΟΥ ΘΕΜΙΣ ΕΣ[ΤΙ]
 ΣΙ ΕΧΕΙΝ ΚΡΥΦΙΗΝ Τ' ΑΦΡΟΔΙΤΗ[N]
 [ΦΙΑΟ]Σ ΟΥΤΟΣ ΟΣ ΟΥ ΜΑΘ ΕΡΑ Α
 [ΚΛΙΣΙ]ΗΣ ΑΠΟΧΑΖΕΟ· ΔΕΙ[Π]
 ΧΑΛΚΕΥΣΑΝ ΕΡΙΝΥΕΣ ΟΥΚ Α 5
 ΕΡΜΕΙΗΣ ΔΙΟΣ ΑΓΓΕΛΟΣ ΟΣ Σ
 [ΑΛ]ΑΣΤΟΝ ΕΧΕΙΝ ΓΟΕΡΗΣ ΤΟ
 ΕΡ ΜΟΙΡΑ ΘΑΝΑΤΦΟΡΑ Α
 Η ΠΑΡΑΜΥΘΟΥ⁵ ΤΗΝ ΘΕΤΙ
 [ΔΕΙ]ΝΑ ΠΑΘΟΥΣΑ ΤΟ ΜΟΡΣΙΜΟΝ [ΗΜΑΡ ΕΠΙΣΠΩ] 10
 [Α]ΣΤΥΦΕΛΙΚΤΟΣ ΑΠΕΙΘΑΝ[ΟΣ]
 ΜΗΔ' ΑΚΑΧΙΖΕ ΔΙΟΣ
 ΥΡΟΑ
 [ΜΕΜ]ΝΟΝΑ Δ
 [ΑΔΙΝΟ]Ν ΣΤΕΝΑΧ 15
 ΙΟΠΗΣ
 ΟΝΤ

On this passage I offer a few notes referring to my reading of the text, and the use and meaning of words occurring in it.

Line 1. There is some sign of an Ε before Χ. The restoration of ΤΙ at the end of the verse is certain. *σέβας* is a Homeric word, *Il. Σ*, p. 178. It occurs frequently in the *Odyssee* (*σέβας μ' ἔχει*). I have some doubt as to the goodness of the Greek, *ἔχε μοι σέβας*.

1. 2. At the commencement I restore by conjecture ΜΟΙΧΟΝ ΕΝΙ ΘΑΛΑΜΟΙ, and supply the Ν omitted by the careless or ignorant scribe. The line will then read—

ΜΟΙΧΟΝ ΕΝΙ ΘΑΛΑΜΟΙΣΙΝ ΕΧΕΙΝ ΚΡΥΦΙΗΝ Τ' ΑΦΡΟΔΙΤΗΝ.

κρύβιος is found in Hesiod, but not in Homer. Observe the form and use of the apostrophe.

l. 3. The following restoration of this line is suggested by my friend Mr. Sidney Graves Hamilton, Fellow of Hertford College, Oxford:

ΟΥ ΓΑΡ ΜΟΙ ΦΙΑΟΣ ΟΥΤΟΣ ΟΣ ΟΥ ΜΑΘΕ ΦΕΡΤΕΡΑ ΛΕΞΑΙ.

l. 4. I supply ΚΑΙΣΙ at the beginning, and Π at the end. Note the use of the colon. Ἀποχάζεο is Homeric, *Od.* Δ. 94.

l. 5. After ΟΥΚ there is something like an apostrophe, of which I do not perceive the meaning. Χαλκεύω is Homeric, *Il.* Ε. 400.

l. 6. Perhaps this line began with ΗΓΑΓΕΝ; and it may have ended with ΟΣ ΣΥ Γ' ΕΕΠΙΑΣ, or ΟΣ ΣΕ Γ' ΕΠΕΜΥΕΝ. Ἑρμείας, not Ἑρμείης, is the Homeric form.

l. 7. I propose to complete the line thus:

ΠΕΝΘΟΣ ΑΛΑΣΤΟΝ ΕΧΕΙΝ ΓΟΕΡΗΣ ΤΟ ΠΑΡΟΙΘΕΝ ΑΝΑΓΚΗΣ.

πένθος ἀλαστον is Homeric. *Il.* Ω. 105.

l. 8. Difficult or impossible as it may be to defend this reading, I cannot see anything here but ΜΟΙΡΑ ΘΑΝΑΤΗΦΟΡΑ Δ. *μοῖρα* ought to have *θανατηφόρος*; with *μοῖρα*, *θανατηφόρα* would agree. It is just possible to conceive that what I take to be ΑΔ at the end of the line may be intended for ΟΙ. But I see no vestige of an I after ΜΟΙΡΑ. *θανατηφόρος* is found in Æschylus, Sophocles, Lucian, and Herodian, not in Homer.

l. 9. I cannot conjecture what **ῥ** stands for. But the use of such an abbreviation furnishes an indication as to the age of the writing. The scansion of the line appears to require that the word thus represented should begin with a short vowel and end with a dactyl or spondee.

l. 9. *παραμυθεῖσθαι* is used by Homer, meaning to *advise*, *persuade*, with a dative of the person.

l. 10. One might complete the line thus:

ΟΣ ΜΗ ΔΕΙΝΑ ΠΑΘΟΥΣΑ ΤΟ ΜΟΡΣΙΜΟΝ ΗΜΑΡ ΕΠΙΣΠΩ,

or something to that effect.

l. 11. At the beginning of the line supply Α, and at the end, perhaps, ΟΣ ΑΝΤΙΟΝ ΗΥΔΑ, completing it thus:

ΑΥΤΑΡ ΟΓ' ΑΣΤΥΦΕΛΙΚΤΟΣ ΑΠΕΙΘΑΝΟΣ ΑΝΤΙΟΝ ΗΥΔΑ.

This word *δοτυφέλικτος* appears to deserve special notice. It is not found in Homer. But the verb *δοτυφέλλειν* occurs frequently in *Il.* and *Od.* The adjective is found in Xen. *Rep. Lac.* xv. 7; Orpheus, *apud Proclum*; Oppian, *Halieut.* l. v., v. 26. Lactantius quotes an oracle of Apollo in which the Deity is described as

Ἀντοφνῆς, ἀδίδακτος, ἀμήτωρ, δοτυφέλικτος.

It occurs twice in the Hymn of Proclus to the Sun. *Ἀπείθανος* (for *ἀπείθανος*) does not occur in Homer, or, so far as I know, in Classical Greek. *Ἀπείθανος* seems to have had only an active sense. It is found in Lucian and Plutarch. *Ἀπείθανος* in Nicet. ad Oribas. p. 93.

l. 12. Note the use of the apostrophe. After ΔΙΟΣ comes a doubtful letter. But quære, was not a mistake made here by the scribe, and roughly cancelled by a stroke of the pen. *Ἀκαχίζω* is frequently found in *Il.* and *Od.* One is tempted to complete the line thus :

ΦΕΙΔΕΟ ΜΗΔ' ΑΚΑΧΙΖΕ ΔΙΟΣ ΝΟΟΝ ΥΨΙΜΕΔΟΝΤΟΣ.

l. 13. The reading of this line is so uncertain that I abstain from conjectures. And yet I feel that a happy guess might enable us to restore a part or even the whole of it.

l. 14. At the commencement restore ΜΕ, so as to suggest a reference either to Agamemnon, or to Memnon, mentioned by Homer, *Od.* Δ. 187, and Δ. 522. See also Proclus' summary of the contents of the *Αἰθιοπία*, a cyclic poem, in five books, by Arctinus.

l. 15. Perhaps supply ΑΔΙΝΟ before Ν ΣΤΕΝΑΧ.

l. 16. Before the letters ΙΟΠΗΣ there are faint traces of what looks like a Θ. If that letter really stood there, we should have good warrant for believing that there was a reference to Memnon in line 14.

In the upper right-hand corner there remain parts of three or four letters, probably belonging to the last word of a line. Then comes a blank space, wide enough for a line, showing that what follows is the commencement of a passage.

It appears to be a speech made by a married woman who refuses to yield to the solicitations of a lover. She

addresses him thus: 'Treat me with due respect. It is not right that I should carry on a secret amour in my chamber. I love not the man who knows not how to give better counsel. Retire, then, from my tent. Leave me here undisturbed. The Furies have possessed thee with a brazen audacity, having led thee hither. Certainly, Hermes the messenger of Zeus was not thy guide'.

The drift of what follows is not plain. It seems to refer to some sorrowful destiny awaiting either the speaker or the person addressed, or possibly both. The mention of Thetis suggests the probability of an allusion to the untimely fate awaiting her son. The speech ends, as I suppose, with the words *μόρσιμον ἡμᾶρ ἐπίσπω*, well fitted to close a passionate appeal.

I supply the missing words in line 11, so as to make it run as follows :—

ΑΥΤΑΡ 'ΟΓ' ΑΣΤΥΦΕΛΙΚΤΟΣ ΑΠΕΙΘΑΝΟΣ ΑΝΤΙΟΝ ΗΥΔΑ.

Then commences the reply of the suitor, addressing the lady [Helen]. He is unmoved, unpersuaded. He will not take a refusal. He urges that his suit is favoured by Zeus. If the name of Agamemnon appeared, as is possible, in line 14, the incident would seem to belong to the time when the Trojan war was going on, and if so the suitor must have been Achilles. His introduction in this character will not surprise the reader who remembers that Proclus, in his summary of the contents of the Cyprian Epic, tells us, *καὶ μετὰ ταῦτα*, that is, after the laying waste of the country round Troy, *Ἀχιλλεύς Ἑλένην ἐπιθυμῇ θιάσασθαι, καὶ συνήγαγεν αὐτοὺς εἰς τὸ αὐτὸ Ἀφροδίτη καὶ Θέτις*. The epithets *ἀστυφελικτος* and *ἀπείθανος* would apply exactly to the hero described as *impiger, iracundus, inexorabilis, acer*.

The letters MNONA in line 14 may, as I have intimated, be part of the name of Agamemnon. But I think it not improbable that they represent the name of Memnon, and





this conjecture is supported by the fact that line 16 gives us the letters ΙΟΠΗ, which may be regarded as part of a word related to αἰθίοψ or αἰθιοπεύς. Memnon, the Ethiopian prince, son of Eos, was slain by Achilles. ΙΟΠΗ may be the ending of the name Antiope. And it is worthy of notice that the story of Antiope, the daughter of Nycteus, is alluded to in the argument of the Cyprian Epic given us by Proclus (see the note in Gaisford's *Hephæstion*, p. 473). But there was another Antiope, to whom allusion may have been made here. She was the wife of Theseus, and was either identical with Hippolyte, the queen of the Amazons, or was her sister. The name of Hippolyte appears in Fragment II., *verso*, line 4, along with that of Hippolytus.

Fragment I., *verso*, is not very legible. I offer, however, the following reading of it, in the belief that I have set down very few letters about which reasonable doubt can be entertained :—

ΣΤΟΙΧ [] ΣΧΕΤΑΙ ΟΡΩΝ

[ΕΑ]ΕΝΗΝ ΘΑΛΕΡΗΝ ΤΙΝΑ ΚΟΥΡΗΝ

ΑΠΟΚΛΕΠΤΗΣΑΤΕ ΚΟΙΤΗΣ

[ΖΗ]ΝΟΣ ΠΕΛΑΘΕΣΚΕ ΓΕΝΕΘΛΗΣ

5

ΠΡΟΦΡΟΝΑΣ ΟΥΣ ΤΕΚΕΝ ΗΔ

[ΚΑΣΤΟΡΑ] . . . ΠΟΛΥΔΕΥΚΕΑ Τ' ΪΠΠΙΟΧΑΡΜΗ[Ν]

[Κ]ΑΚΟΜΗΧΑΝΟΝ ΟΥΕ ΔΕ ΠΟΙΝ

ΓΕΝΝΕΣΙΗΣ ΑΦΡΟΔΙΤΗΣ

Ν ΕΠΙ ΠΡΙΑΜΟΙΟ ΤΙΘΗΝΗ

10

ΣΙ ΚΑΙ ΑΥΤ

ΚΑΙ ΑΔΗΡΗΝ

ΟΙ ΑΥΤΩ

Line 1. At the left-hand upper corner, though the photograph fails to show it, there are a few letters which look like ΦΕΙΔΡ or ΦΑΙΔΡ. If the latter, we have, perhaps, part of the name of Phaedra, stepmother of Hippolytus, whose name occurs in Fragment II., *verso*.

l. 2. I cannot be sure as to what follows ΣΤΟΙΧ. The words appear to be the beginning of a hexameter. Between lines 2 and 3 there is a blank space wide enough for four lines. This seems to show that line 3 was the first of a paragraph.

l. 3. Supply ΕΛ at the beginning. ΘΑΛΕΡΗΝ and ΚΟΥΡΗΝ are both Homeric words.

l. 4. The reading of ΑΠΟΚΛΕΨΤΗΣΑΤΕ is difficult, but nearly certain. ἀποκλέπτω is found in the hymn to Mercury. But ἀποκλεπτέω is unknown. However, we find ῥιπτέω beside ῥίπτω. κώϊη is found in the *Odyssee*.

l. 5. ΖΗ is, no doubt, to be supplied at the commencement. ΠΕΛΑΘΕΣΚΕ is not one of the parts of πέλω or πελάζω occurring in Homer. ΓΕΝΕΘΑΗ is used by him frequently.

l. 6. ΠΑΡΟΦ is plainly written. For the character after Π stands for ΑΡ or ΕΡ, not Ρ (see lines 3 and 7). But the Ο following it seems clearly to show that the word ought to be ΠΡΟΦΡΟΝΑΣ rather than ΠΑΡΑΦΡΟΝΑΣ. A contrast seems to be indicated between the characters of Castor and Pollux and that of Helen, who is termed ΚΑΚΟΜΗΧΑΝΟΝ, as she called herself: *Il. Z. 344*. Again, πρόφρων is an epic word common in Homer and Hesiod. Not so παράφρων. Πρόφρων, as it occurs in Homer, means in general, *having a good and earnest purpose*.

Something might be said in favour of our reading ΛΗΔ[Η] as a correction for ΝΗΔ[Η]. Mr. Hamilton observes that the poet is contrasting Helen, the κακομήχανον of v. 8, with her excellent brothers, those πρόφρονες, οὓς τέκεν ἤδη, 'to whom Leda had *already* given birth,' before the birth of Helen, which is possibly spoken of here.

l. 7. Observe Τ' instead of Θ'. Pollux was the god and patron of boxing and wrestling, πύξ ἀγαθός, and ἀεθλοφόρος. To Castor belonged the epithet ἱππόδαμος. But our author may have thought to prove his originality by calling Castor ἱππόδαμον, and Pollux

ἱπποχάρμην (Il. Ω. 257). Both of the Dioscuri were invoked as ταχέων ἐπιβήτορες ἱππων (Hom. Hym. xvi. and xxxiii.), and they were generally represented as mounted on white horses.

l. 8. Mr. Hamilton says, 'Possibly we might thus supply the words wanting at the beginning of lines 8 and 9—

‘ΤΗΝ ΔΕ ΤΕΚΕ ΤΡΙΤΑΤΗΝ ΚΑΚΟΜΗΧΑΝΟΝ ΟΨΕ ΔΕ ΤΟΙΝ
‘ΥΣΤΑΤΗ Η Γ’ ΕΦΑΝΗ ΠΑΡΑ ΓΕΝΝΕΣΙΗΣ ΑΦΡΟΔΙΤΗΣ.

'But whether TOIN or IOIN is the right reading I cannot tell from the photograph. *Aphrodite genesis* is quite a natural conception, no doubt, though I can find no trace of her elsewhere. Assuming her existence φανῆναι παρὰ Γ. Α. would be not an unnatural paraphrase for "to be born." I translate, "Her (Helen), did she (Leda or Nemesis) bring forth the third, a deviser of evil: but late, after her two brothers, did she appear by the help of Aphrodite, who presides at birth." I fancy the poet wishes to increase the contrast between Helen and her brothers, by making her birth separate from theirs.' I am inclined to read IOINH in line 8. There is a natural connexion between the name of Helen and that word: see Il. Γ. 280-291.

l. 10. If τεθῆνῃ here means *nurse*, I have no idea who is alluded to. But it might be used for *mother*, as by Coluthus. Strymo was the name of Priam's mother.

l. 11 perhaps ends with ΑΥΤΟΙΣ. Compare νοέοντι καὶ αὐτῷ: Il. Ψ. 305.

l. 12. If the word ἀδῆρις occurs here, it means *without contest* (= ἀδῆριτος).

In this fragment we have the endings of eleven hexameter lines, complete in every case, with the exception of a letter or two. The whole passage has evidently a continuous sense, referring to Helen and her brothers the Dioscuri. The writer had in his mind the passages in the Iliad and Odyssey where they are mentioned. I strongly suspect that he also had before him the Cyprian Epic, in which the legends respecting them are twice if not thrice alluded to.

Fragment II. *recto*, is very legible. It gives us eleven lines, of which each wants about a foot and a-half both at the beginning and ending. I read it thus:—

[ΔΟ]ΜΟΙΣΙΝ ΘΕΩΝ [ΕΠΑΓ]ΟΥΣΙ[Ν]
 [ΜΕ]ΜΑΑΣΙΝ ΕΠΟΥΡ[ΑΝ]ΙΟΙΣΙΝ Μ[ΑΧΕΣΘΑΙ]
 [Μ]ΕΝΕΛΑΟΥ ΚΕΛΕΥΣΑΝΤΟ[Σ]
 [ΚΑ]ΤΑ ΘΕΣΜΟΝ ΕΚΥΩΝ ΑΙ[ΔΟΜΕΝΗ ΠΕΡ]
 [ΖΗ]ΝΙ ΘΕΩΝ ΒΑΣΙΛΗΑ ΧΟΛΩ 5
 [ΝΗ]ΥΣΙ ΧΘΟΝΟΣ ΑΝΤΙΣΚΟΝΤΟ
 ΟΥΣΙ ΑΝΙΣΤΑΙ Μ[Η]ΚΟΡΟΝ ΕΣΧ
 ΕΜΕΙΟ ΚΑΚΗΝ [ΑΠ]ΑΜΥΝΟ[Ν] ΕΡΙΝ[ΥΝ]
 ΜΟΣ ΜΑΡΟΜΗΘΕΑ ΜΗΛΑ ΝΟΜΕΥ
 Ν ΕΠΙΤΕΡΠΟΜΑΙ ΕΣΧ ΕΤΙ ΛΕΥΣ 10
 ΛΩΤΕ ΚΑΙ ΟΥ ΚΟΡΟΝ ΕΥΡΕΝ ΕΔΩ[ΔΗΣ]
 ΦΕΡΟΥΣΑ Κ

Lines 1 and 2. Observe the *νῦ ἐφελκυστικόν* incorrectly added in this and the following line. I offer the reading ΕΠΑΓΟΥΣΙΝ with some doubt. The words *δόμοισι θεῶν*, and the whole of the next line, lead one to expect some word here meaning to *attack*. Compare *Il. Z.* 120, 129. Observe a large Δ between lines 1 and 2. Might this have been intended to mark an error, or even to cancel this portion of the ms.?

l. 3. This line will not scan. Could the words have been transposed? or might the author have written ΜΕΝΕΛΑΟ gen. of ΜΕΝΕΛΑΑΣ. In the Alexandrian dialect the terminations of proper names were not unfrequently altered in this way.

l. 4. The conjecture of ΑΙΔΟΜΕΝΗ ΠΕΡ is rather bold, but it may be defended. For instance, we have in the Cyprian Epic—

φιλότῃτι μῆγῖσα
 Ζηνὶ θεῶν βασιλῆϊ τέκε κρατερῆς ὑπ' ἀνάγκης.
 Φεύγε γὰρ οὐδ' ἔθελεν μυχθῆμεναι ἐν φιλότῃτι
 Πατρὶ Διὶ Κρονίωνι· ἐτείρετο γὰρ φρένας αἰδοῖ.

And the use of the word is justified by *Od. II.* 75, T. 527. *θεσμών* occurs only once in Homer, *Od. Ψ.* 296, where the word has the

...τοῦτον τὸν ...
 ...καὶ ἐπορεύθη ...
 ...ἐν τῷ οὐρανῷ ...
 ...ἵστα ὁ κύριος ...
 ...ἐν τῷ οὐρανῷ ...
 ...καὶ ἐπορεύθη ...
 ...ἐν τῷ οὐρανῷ ...
 ...καὶ ἐπορεύθη ...
 ...ἐν τῷ οὐρανῷ ...
 ...καὶ ἐπορεύθη ...
 ...ἐν τῷ οὐρανῷ ...

same peculiar meaning. Κνέω in Homer has the *v* short: *Il.* T. 117, Ψ. 266. Supposing that we may lengthen the *v*, there remains some mistake in the word ΕΚΥΩΝ. Perhaps we may read ΕΚΥΕΩΝ, and assume that the word has the meaning suggested by the passage quoted above from the Cyprian Epic.

l. 5. Here the text must be corrected. We must read either ΖΗΝΑ or ΒΑΣΙΛΗ. The former is much more probable. χολώω, act., means to *enrage* or *incense*, and takes an accusative. In the middle or passive it takes a dative of the person who is the object of anger.

l. 6. Observe the cacography in ΑΝΤΙΣΚΟΝΤΟ: The interchange of K and X was common in the Alexandrian dialect.

l. 7. Prosody forbids us to read ΟΥΣΙΑΝ ΚΑΙ, which is most obvious; and we should admit a form of K, of which we have no other example in this ms. May we read ΘΥΣΙΑΝ ΚΑΙ, though the first letter is certainly O, and not Θ?—ΟΥΣΙ[Ν] ΑΝΙΣΑΙ does not seem to give help towards the meaning; and against this it may be urged that the Σ has an unusual form. The K in ΚΟΠΟΝ is not absolutely certain. ΠΟΠΟΝ is possible.

l. 8. Since the photographs were made for the illustration of this Paper, I found a small scrap of papyrus, which has enabled me to add a few letters to the endings of the verses in Fragment II., *recto*, and a few more to the beginnings of those in Fragment II., *verso*. We have thus gained the word ΕΠΙΝΥΝ. Before I had this help, I had supplied the word ΑΝΑΓΚΗΝ, suggested by a line quoted above from the Cyprian Epic.

l. 9. I conjecture ΗΜΟΣ at the beginning, and had guessed at ΝΟΜΕΥΟΝ or ΝΟΜΕΥΕΝ, suggested by *Od.* K. 85, before I had seen the fraction of this fragment mentioned in the last note. The uncommon word ΜΑΡΟΜΗΘΕΑ suggests inquiry. μάρον = πῶα, Hesych. Pliny, xii. 53, mentions μάρον, *Teucrium marum*: *marjoram*, according to Passow. Pliny says the Egyptian *marum* was better than the Lydian. The reading is quite certain; but what is the termination? Mr. Hamilton says, 'one is reminded in a provoking way of Homer's ἦθεα καὶ νομὸν ἱππων.'

l. 10. The reading of ΕΣΧ ΕΤΙ is nearly certain. ΑΕΥΣ is given by the supplemental fragment.

ἐπιτέρπομαι is used by Homer, *Od.* xiv. 228.

l. 11. KOP was more legible when I first examined the papyrus. A few fibres were, I fear, detached by a reader, who did not handle it tenderly enough.

It is not easy to ascertain the drift of these lines. Supposing them to have a continuous sense, we may regard them as part of the speech of a woman [Helen?]. Observe the words: *ικύνειν, ἐμείο, ἐπιτέρπομαι, φέρουσα*. First comes, in lines 1 and 2, what looks like an allusion to the war of the Giants against Zeus. The speaker then refers to some command of Menelaus. Perhaps we have here a part of Helen's story as told in the *Κύπρια*: *Καὶ μετὰ ταῦτα Μενέλαος εἰς Κρήτην ἐκπλεῖ, κελεύσας τὴν Ἑλένην τοῖς ξένοις τὰ ἐπιτήδεια παρέχειν, ἕως ἂν ἀπαλλαγῶσιν*. (See Gaisford's *Hephæstion*, p. 472.) She tells how she had reluctantly yielded to the solicitations of Paris, feeling that resistance to the will of Zeus and Aphrodite was fruitless. Then, perhaps, comes a reference to the detention of the Greek fleet at Aulis, or to the circumstances of her own flight by sea to Sidon or Ilium. I find it difficult to trace the connexion of line 7 with what precedes or follows. The reading is uncertain. MH KOPON seems probable. ΠΟΡΟΝ is possible. The speaker then tells how she warded off some terrible misfortune at a time when she was engaged in the happy pursuits of a pastoral life. As to the meaning of what follows I offer no conjecture. I only notice the possible repetition of the word KOPON.

Mr. Hamilton's commentary on the passage, and his restoration of the first five lines, deserves attention. 'With the idea', he says, 'that the passage might refer to the rape of Helen by Paris, I wrote the first five lines thus:—

οἱ δ' ἐπὶ οἴσι δό ΜΟΙΣΙ ΘΕΩΝ ΕΠΑΓΟΥΣΙΝ ὀπωπὴν,
νήπιοι, οἱ μεΜΑΑΣΙΝ ΕΠΟΥΡΑΝΙΟΙΣΙ Μάχεσθαι.
οἱ δ' ὅτε δὴ ΜΕΝΕΛΑΟ ΚΕΛΕΥΣΑΝΤΟΣ ῥ' ἔχοντο,
δὴ τότε' ἐγὼ καΤΑ ΘΕΣΜΟΝ ΕΚΥΕΟΝ Αἰδομένη περ,
δαισαμένη μὴ ΖῆΝΑ ΘΕΩΝ ΒΑΣΙΛΗΑ ΧΟΛΩΣΩ.



'I suppose that Helen is telling the story of her own seduction; in lines 1 and 2 she is reminding her interlocutor of the fate of those who oppose the will of the gods: "They bring the notice (ὁπωπήν) of the gods upon their own houses, fools, that set themselves up to fight against heavenly power". She therefore listens to Paris because it is the will of Aphrodite.

'v. 3. οἱ, sc. her husband's people—ῥῆχοντο, sc. to Crete.

'v. 4. κατὰ θεσμόν.? according to arrangement: as in Coluthus, Τοίην συνθείην καλλίσφυρος ἔννεπε νύμφη, of the same matter. Beyond this I can make out nothing; and I certainly do not see how, with my reading of these five lines, I am to come to verse 8, where I suppose there can be no doubt that we must read—

‘. . . ἀπ’ ΕΜΕΙΟ ΚΑΚΗΝ ΑΠΑΜΥΝΟΝ ἀνάγκην.’

Fragment II., *verso*, is read with difficulty, parts of the papyrus having been much abraded. The small supplemental fragment has given us the beginnings of lines 7-12 :—

	[ΕΥ]	ANT	1
	[ΚΑ]	ΙΣΙΗΣ ΚΡ[ΑΤΕ]ΡΟΝ ΠΑΤΡΟΚΛΟ[Ν]	
		ΠΕΠΛΟΝ Ε[ΠΑ]ΙΚΛΟΚΟΝ ΑΔΡΟ[Ν]	
		ΛΟΚΑ ΎΠΠΟΛΥΤΕ[Ι]Α	
		[Ε]ΔΩΚΕ ΚΑΙ ΎΠΠΟΛΥΤΟΣ Μ[ΟΙ]	5
	[ΟΦΘΑΛΜ]	ΟΙΣΙΝ ΎΠΟΔΡΗΣ[ΙΝ] ΠΑΡΑΚΟΙΤ	
	ΙΟΧ[]Υ	ΠΑΡΑΛΕΞΟΜΑΙ [Η] ΓΕΝΕΤΗ	
		ΝΕ[Μ]ΕΣΙΝ ΤΩΝ ΠΑΙΔΩΝ ΤΗΣ ΝΙΟ[ΒΕΙΑΣ]	
	[Ν]ΙΟΒΗ	ΝΕΚΥΩΝ ΣΤΙΧΑΔ ΙΚΕΟ ΤΟΣ	
	ΑΙ ΓΙΓΝΩΣΚΕ ΘΕΩΝ ΣΘΕΝΟΣ Η		10
	Ν ΕΡΕΗΣΙ ΤΙ[Ν] Α]ΥΤΩΝ Ε ΕΚ[]ΣΕ'		
	ΣΤΡΟΦ	ΚΑΙ	

Line 1. After what looks like parts of E and Y, I conjecture Σ, and suggest the possibility, I might almost say the probability, of our having here the name of AXIAAEYΣ. Of the ANTION, the first three letters are plainly legible; the ION are probable. HYΔA follows, of course, if ANTION is accepted.

1. 2. The name of Patroclus certainly appears here.

1. 3. Between E and I there is room for two letters. We may say with certainty that E was followed by Π, of which portions remain. About the second I entertain no doubt. It was A, giving us the word ΕΠΑΙΚΑΟΚΟΝ, the meaning of which is obvious, though I believe it appears in no dictionary. Αἰκλον, according to Athenæus, was the name of the *cena vespertina*, or *postcenium*, among the Lacedæmonians; and ἐπαικλα were the viands served at this meal, the *secundæ mensæ*, according to the same authority. The πέπλος, as we learn from Homer (*Il. E.* 194, *Ω.* 796; *Od. H.* 76), was not always used as an article of dress. The πέπλος mentioned here seems to have been an ornamental table-cover. ἀδρός means *strong*. I think it might be properly applied to a rich material. ΕΠΑΙΚΑΟΚΟΝ is the Alexandrian misspelling of ΕΠΑΙΚΑΟΧΟΝ, as in ΑΝΤΙΣΚΟΝΤΟ, above, *Frag. II., recto*, l. 6.

1. 4. Here I conjecture ΚΑΛΛΗΠΑΟΚΟΣ. ΠΑΟΚΟΣ was used with the same meaning as ΠΑΟΚΑΜΟΣ, and I fancy the scribe did not know or remember that a compound of this kind ought to be an adjective of two terminations. He did not trouble himself about hiatus.

1. 5. Here, as is common in the Homeric poems, where mention is made of gifts, we have a history of the manner in which the givers became possessed of them.

1. 6. ΚΟΙΤ, at the end of this line, is very doubtful. ὑποδρῆς is a word used by Nonnus, with the signification, *with dark or angry looks*. Compare ὑπόδρα ἰδὼν and ὑφορᾶσθαι.

1. 7. ΓΕΝΕΘΗ or ΓΕΝΕΘΗ is tolerably certain. παραλέγομαι: see *Il. Ω.* 676.

1. 9. Note the use of the ἐπίσημον for ΣΤ. ΙΚΕΟ ΤΟΣ, at the end, is pretty certain. We might supply ΣΗΝ to make ΤΟΣΣΗΝ.

1. 11. I have not satisfied myself as to the reading or meaning of this line; *Davus sum, non Oedipus*.

As regards the general drift of this passage, I venture to assert my belief that Achilles is here the speaker. I suppose that he is directing a messenger to bid Patroclus, his beloved kinsman, *who shared his tent*, to bring or send a πέπλον, no doubt to be offered as a present to the person whose favour he was seeking. She, with downcast eyes, ὀφθαλμοῖσιν ὑποδρῆσιν, refuses compliance. What follows is not plain. First comes an allusion to the story of Niobe, not unknown to Achilles (see *Il. Ω. 602*). Perhaps he refers to it here as containing a warning against a defiance of the Divine power (θεῶν σθένος).

The word πέπλον, and the names Hippolyte and Hippolytus, ought, one would think, to supply us with a clue to the drift of this passage. As yet I have not been successful in following it up, though it has led me some way.

Admete, the daughter of Eurystheus, desired to obtain the girdle of the Amazon queen, Hippolyte, daughter of Ares (her *pepla*, too, Eurip. *Herc. Fur.* 408, *Ion*, 1143). To win this prize was one of the labours imposed upon Hercules (Apollod. 2. 5. 9). Accompanied by several companions, he took ship, entered the harbour of Themiscyra, and being met on his landing by the queen, begged her to give him the girdle. She engaged to give it; but Hera hindered the fulfilment of her promise by telling the rest of the Amazons that the strangers had offered violence to their queen. Coming down in arms to protect her, they engage in conflict with Hercules and his companions. Hercules, suspecting treachery, kills Hippolyte, and, having thus obtained the girdle, brings it to Eurystheus. According to other legends, Hercules received the girdle as a ransom from Melanippe, the only Amazon whom he released. Or, Antiope (= Hippolyte) gives it to Theseus, who causes all the rest to be put to death (Diod. Sic. 4. 16, Plutarch. *Thes.* 28). In one way or another, we can see how the girdle and *pepla* of Hippolyte fell into the hands

of Theseus, who was engaged in contest with the Amazons, either when he was in company with Hercules, or at a later period. The story of Helen is brought into connexion with that of Hippolyte and Hippolytus by the fact that her brothers the Dioscuri, during the absence of Theseus, invaded Attica, and brought away their sister, who in her youth had been carried thither as a captive by Theseus.

I do not see any ready way of finding a point of contact between the story of Hippolytus and that of Achilles, except indeed that Peleus was one of the Argonauts, and so a companion of Theseus.

In the whole of this passage there seems to be a general continuity of sense which is at variance with the notion of our having before us only a set of unconnected quotations, jotted down by a student or a grammarian. Occasional memoranda or extracts, such as are entered in a commonplace book, are seldom written with the uniformity which characterizes the handwriting of this papyrus.

When first I looked at these verses, and noticed in them the names of Helen, Menelaus, Patroclus, and Priam, I hastily conceived the hope that I had lighted on some fragments of the Cyprian Epic, the argument of which has been preserved for us by Proclus. A closer scrutiny has led me to a different conclusion. It is quite true that these verses contain several archaic words commonly used by Homer. But this would not be inconsistent with the supposition that they belonged to a comparatively recent age. In the Alexandrian School there were for several centuries a host of grammarians, critics, and makers of verses, amongst whom Homer was an object of devoted study. So perfect was the familiarity with his works acquired by some of them, that a class of writers called *Homeric poets* exercised their ingenuity in forming centos of verses taken from the works of Homer, and pieced together so as to apply to subjects of a wholly different kind. One of these

compositions, an epigram of four lines, is now to be seen inscribed on one of the legs of the colossal statue of Amenophis III., at Thebes, known as the vocal Memnon. It bears testimony to the fact that the author Arius, a Homeric poet, had heard the musical sound produced by the rays of light striking the statue at sunrise¹:

ὦ πόποι, ἦ μέγα θαῦμα τόδ' ὄ[φθαλμοῖσιν ὀρώμαι.]

Ἡ μάλα τις θεὸς ἔνδον, οἱ οὐρανὸν εὐρὺν ἔχουσιν,

ἤρυσεν φωνήν· κατὰ δ' ἔσχεθε λαὸν ἅπαντα·

οὐ γάρ πως ἂν θνητὸς ἀνὴρ τάδε μηχανόετο.

In an epic composed by one of the poets of the Alexandrian Museum we should be sure to find an abundance of Homeric words and phrases. But the date of the composition would probably be indicated by the introduction of expressions of a later period. Whether we receive or reject the tradition that the Cyprian Epic was written by Stasinus, the son-in-law of Homer, it was at all events referred to by Herodotus, and there is reason to doubt whether such words as ἀστυφέλικτος, μαρομήθης, ἐπαικλοχος, ὑποδρής, could have been found in so ancient a poem.

The reader may, perhaps, think it worth his while to consider a very different theory as to the authorship of these fragments, though it rests upon slight and narrow foundations. It is, in fact, a mere guess. I venture how-

¹ The first line is found four times in the *Iliad* (N, 99, O, 86, T, 344, Φ, 54), in the *Odyssey* (T, 36), and in the *Hymn to Mercury* (219); the second in the *Odyssey* (T, 40); the third in the *Odyssey* (Ω, 530); but instead of φωνήν, our texts of the *Odyssey* give φωνῇ, which is the true rendering. The memory of our Homeric Poet was at fault here. The fourth line is taken from the *Odyssey* (Π, 194). S. Epiphanius (*Her.* xxxi. 29) quotes ten lines from

a cento of this kind, on the Descent of Hercules into Hades, all of them taken without the change of a letter from the poems of Homer. The reader will find in the Greek Anthology two epigrams made up entirely of verses taken from Homer, with the exception of trifling changes (*Anal.* iv. 116, Jacobs). Centos were also composed by putting together verses taken from Virgil (*Fabr. Bibl. Lat.*)

ever to state it. A critic might be excused for believing, though he could go little way to prove, that these hexameters were part of a cyclic poem written by Proclus the Neoplatonist. Proclus may not have deserved the exaggerated praises bestowed upon him by his editor Victor Cousin ; but he was undoubtedly a man of great capacity and varied acquirements. He is best known as a philosopher and a mathematician ; but he was also a man of letters, and presided with distinction over the school of Athens. He wrote a commentary on Hesiod which is extant. An abstract of his *Χρηστομαθία γραμματική*,¹ a treatise on the matter and style of the writings of the most celebrated Greek poets has been preserved in the *Bibliotheca* of Photius. He wrote a short life of Homer, also Scholia, and a Commentary on the works of that poet. His biographer Marinus, who succeeded him as president of the School of Athens, tells us that he composed many hymns, in which he celebrated not only the divinities of the Greeks, but also those venerated by the Arabians, Nubians, and other nations. He was laborious to a miracle. If we may believe Marinus, he frequently completed in one day as many as five or even more lectures, and wrote, besides, many verses, often to the number of seven hundred ; and he continued this career of poetic diligence in his old age after his health had been impaired by labour and asceticism. Of all these compositions only six have been preserved : a hymn to the Sun, two to Venus, and one to the Muses ; also two elegiac poems, one an inscription on a statue of Dionysus, the other his own epitaph.

¹ Following Fabricius and other authorities, I have assumed that Proclus Diadochus, who died A.D. 485, was the author of the *Χρηστομαθία γραμματική*. This was disputed by Valesius (Henri de Valois), who asserts

that Alexander of Aphrodisias (*flor. circ. A.D. 200*) refers to the testimony of Proclus in his *Chrestomathia*. I have not the means of testing the accuracy of this statement.

Thomas Taylor, who not only translated and commented on the works of Proclus, but was a devout believer in his whole system of philosophy and theology, speaks of the merit of these poems in terms of extravagant praise: 'They bear,' he says, 'most evident marks of a mind full of divine light, and agitated by the fury of the Muses, and possess all that elegance of composition for which the writings of Proclus are so remarkable'; and he adds that 'they breathe too much of the spirit and manner of Proclus to be the production of any other.' Without discussing their merit, we are safe in recognizing their genuineness and authenticity as sufficiently proved by internal and external evidence.

Proclus then was a poet, a student of Homer, and acquainted with the poems forming the Epic Cyclius. We learn from him that it existed in his time in its entirety, and was an object of general interest, not so much on account of its merit as because of the sequence of the events of which it treated. Valuing it thus, he has preserved for us the arguments of the principal works included in it—the Cyprian Epic by Stasinus; the Aithiopis and the Excidium Trojæ by Arctinus; the Ilias Parva of Lesches; the Nostoi of Augias; and the Telegonia of Eugammon; and being familiar with these poems, it is not improbable that he may have written on some subject of that class, perhaps a long hymn like one of the Homeric ones. Now it will be observed that the persons and circumstances mentioned in our papyrus hexameters fall within the compass of the argument of the Cyprian Epic. It is therefore not unreasonable to suspect that their author, if it were not Stasinus himself, had before him the Cyprian Epic, and was engaged in the composition of a poem on the same subject or on some part of it. To fix the authorship on Proclus, we have almost nothing deserving the name of argument or evidence. But the following considerations

point in that direction :—(1) The visit of Achilles to Helen, plainly referred to, as I maintain, in our hexameters, is mentioned by Proclus in his analysis of the contents of the Cyprian Epic, and, so far as I have been able to ascertain, by no other writer of all those who have treated of the legends connected with the Trojan War. (2) The few hexameters by Proclus which have come down to us contain a couple of words to which we may point as suggesting the idea that our hexameters came from his hand. One of these is the rather uncommon adjective ἀστυφίλικτος, which seems to have been a favourite word with him. He had met with it in Orpheus, and it occurs twice in his Hymn to the Sun. Of the word γενέθλη the same thing may be said. It occurs three times in the Hymns of Proclus, and always at the end of a line, as in Frag. I., *verso*, l. 5. Κατὰ θεσμὸν, found in Frag. II., *recto*, l. 4, appears in the Hymn to the Sun.

On the handwriting of these fragments I have not felt able to form a decided judgment. I failed to discover amongst the Greek papyri in the British Museum any precisely similar to it. I take it to be that of a professional scribe, a book-writer, as Eusebius would have called him. This is indicated by the firmness and general evenness of the manuscript. A grammarian or poet might write as well ; but he could not make such mistakes as this scribe has committed.

On the other hand, it is to be remarked that almost every letter in the alphabet is presented in different forms. The diversity seems to have been caused in several instances by the disposition to form ligatures, such as occur commonly in majuscule writing. The I and Y appear sometimes as ἰ and ῑ. This goes but little way towards fixing the age of the MS. We cannot be far wrong in assigning to it a date between A. D. 200 and A. D. 500.

In conclusion I desire to say, by way of apology for

what I have written or left unwritten in this article, that I offer my conjectures as to the reading and interpretation of these fragments with great reserve. Scholars better versed in the mythology of Greece, and familiar with the substance and style of the Cyclic poets, would perhaps discern meaning and trace allusions in words, or even in syllables, which I have been unable to interpret or even to read. I can claim no credit for what I have done, beyond obtaining a tolerably good first approximation towards a reading of these fragments. If they should be thought to deserve a more careful examination, it is very certain that a keener sagacity, and a scholarship more extensive and exact, will find answers to questions upon which I have not felt myself competent to pronounce.

C. LIMERICK.

ON THE ELISION OF WORDS OF PYRRHIC VALUE.

MR. VERRALL, in a very able paper in the *Journal of Philology*, vol. xii., No. 23, pp. 136, ff., in treating of the elisibility of dissyllables of pyrrhic value, gives certain rules which limit their elisibility, or rather draws attention to certain usages in the tragic writers which appear to him to point to rules, and which at all events justify a closer examination of the question.

Before I state Mr. Verrall's general rules, I would premise that all pyrrhic words are, according to Mr. Verrall, elisable *ad libitum*, except *substantives, adjectives, the pronoun ἐγώ, the numerals ἑνα, μία, and the adverbs in -α*; and that his observations apply fully only to Aeschylus and Sophocles. He considers Euripides separately; and I shall follow his example in this respect.

His rules are:—

(1) A dissyllabic substantive or adjective, having the penultimate short, may be elided, if *both* the following conditions are fulfilled, *viz.* if—(α) it commences a verse, and also (β) has a strong emphasis.

(2) A vocative of this form (*e. g.* ξένε) may be elided, and therefore generally is elided, when it is preceded by the interjection ὦ, but not otherwise.

(3). Except under the conditions stated in (1) and (2), such substantives and adjectives are not elided.

(4). The adverbs in -α (*ἄμα, δίχα, etc.*) are elided in cer-

tain familiar combinations, but otherwise follow the rules for substantives.

(5). The numerals *ἕνα* and *μῆα* are treated as adjectives, except in certain familiar combinations.

(6). *πάρα* (for *πάρεστι*) is not elided.

Now Mr. Verrall, in the course of his paper, mentions a very considerable number of cases of elision of a pyrrhic word. Many of these elisions are justified, according to him, under (α) and (β) of rule 1, quoted above. But they all have one remarkable quality in common. *In not one of these cases does the elided word precede a full stop.* By a full stop I mean the period, and sometimes the colon. But the colon and the mark of interrogation may or may not make a full stop, according to the sentence; and we shall find that, in those very rare cases where we meet an elision of a pyrrhic word before a colon, there is good reason to substitute a comma for the colon, the fuller stop not being really required by the nature of the sentence. I quote from Dindorf's fifth edition of the *Poetae Scenici*.

The only passage cited by Mr. Verrall (pp. 137-162), which gives an elision before any stop fuller than a comma, is Soph. O. R. 957 : *τί φῆς, ξέν' ; αὐτός μοι σὺ σημήνας γενοῦ*, where it seems clear that the note of interrogation is not really equivalent to more than a comma, followed, as it is immediately, by *αὐτός . . . γενοῦ* : 'what sayest thou, tell me?' would be a natural way of rendering the verse in English.

This being so, I believe that no rule is indicated, except what I may call a rule of punctuation. The elision of a word so slight as *φρένα*, *χθόνα*, just before a real pause in the sense, was felt to be unrhythmical; but was perfectly right, and in no way unrhythmical, when there was no pause in the sense after the slight pyrrhic word, or when there was only such a pause as we should mark by a comma, or a note of interrogation immediately followed by

words closely connected with the foregoing. Though without diacritical signs, the Greeks were acutely sensitive to real pauses in the sense; and a pyrrhic word seemed to them too slight to bear the weight of a completed thought. According to this view, we have here a practice quite in accordance with that of the bucolic poets, if we accept Dr. Maguire's statement of the rule, which seems to me to be the only one which makes any real attempt to colligate the phenomena; namely, 'when the fourth foot ends with a word, the fourth foot must be a dactyl, *if there is a full stop after the fourth foot*.

Professor Davies had, in his thorough-going way, drawn up a list of all the pyrrhic elisions in the tragic poets. His kindness has allowed me to profit by his valuable labour; and from his table, which he has placed in my hands, I extract such verses as bear on Mr. Verrall's observation, omitting verbs, prepositions, and other parts of speech not included by him under the operation of his rules.

AESCHYLUS.

- Suppl. 842. σοῦσθε σοῦσθ' ὁλοαὶ μέγ' ἐπ' ἄμαλα.
 „ 896. ἔχιδνα δ' ὥς με τις πόδ' ἐνδακοῦσ' ἔχει.
 Persae 118. κένανδρον μέγ' ἄστν Σουσίδος.
 Sept. 628. δορίπωνα κάκ' ἐκτρέποντες ἐκ γᾶς.
 „ 782. δίδυμα κάκ' ἐτέλεσεν.
 Agam. 907. τὸν σὸν πόδ', ὦναξ, Ἰλίου πορθήτορα.
 Eumenid. 901. τοίγαρ κατὰ χθόν' οὔσ' ἐπικτήσῃ φίλους
 Fragm. 196. ὑπόσκιον θήσῃ χθόν', οἷς ἔπειτα σὺ.

SOPHOCLES.

- Ajax. 386. μηδὲν μέγ' εἴπῃς. οὐχ ὀρᾶς ἴν' εἰ κακοῦ;
 „ 1088. αἰθῶν ὑβριστῆς, νῦν δ' ἐγὼ μέγ' αὖ φρονῶ.
 Antig. 837. σύγκληρα λαχεῖν μέγ' ἀκοῦσαι.
 O. R. 62. τὸ μὲν γὰρ ὑμῶν ἄλγος εἰς ἓν ἔρχεται.
 „ 283. εἰ καὶ τρίτ' ἐστί, μὴ παρῆς τὸ μὴ οὐ φράσαι.
 „ 409. ἴσ' ἀντιλέξαι τοῦδε γὰρ κάγῳ κρατῶ.

- O. R. 544. ἴσ' ἀντάκουσον, κᾶτα κρῖν' αὐτὸς μαθών.
 „ 638. καὶ μὴ τὸ μηδὲν ἄλγος ἐς μέγ' οἴσετε ;
 „ 931. αὐτως δὲ καὶ σύ γ', ὦ ξέν'· ἄξιος γὰρ εἶ.
 „ 957. τί φῆς, ξέν' ; αὐτὸς μοι σὺ σημήνας γενοῦ.
 „ 1179. κάκ' ἐς μέγιστ' ἔσωσεν. εἰ γὰρ οὗτος εἶ
 „ 1250. ἐξ ἀνδρὸς ἀνδρα καὶ τέκν' ἐκ τέκνων τέκοι.
 „ 1484. ὅς ὑμῖν, ὦ τέκν', οὐθ' ὁρῶν οὐθ' ἱστορῶν
 „ 1501. οὐκ ἔστιν οὐδεὶς, ὦ τέκν', ἀλλὰ δηλαδὴ
 „ 1511. σφῶν δ', ὦ τέκν', εἰ μὲν εἰχέτην ἦδη φρένας.
 Oed. Col. 492. ἄλλως δὲ δειμαίνοιμ' ἂν' ὦ ξέν', ἀμφὶ σοί
 „ 831. ὦ γῆς ἀνακτες. ὦ ξέν', οὐ δίκαια δρᾶς.
 „ 835. τί δρᾶς, ὦ ξέν' ; οὐκ ἀφήσεις ; τάχ' ἐς,
 „ 824. χώρει, ξέν', ἔξω θᾶσσον, οὔτε γὰρ τὰ νῦν.
 „ 877. ὅσον λῆμ' ἔχων ἀφίκου, ξέν', εἰ τάδε,
 „ 1206. μόνον, ξέν', εἴπερ κείνος ᾧδ' ἐλεύσεται.
 „ 1130. καὶ μοι χέρ', ὦναξ, δεξιὰν ὄρεξον, ὥς
 Electra 633. τοῦμόν στομό', ὥς οὐκ ἂν πέρα λέξαιμ' ἔτι.
 „ 662. τὰδ' ἐστίν, ὦ ξέν'· αὐτὸς ἥκασας καλῶς.
 „ 671. τὸ ποῖον, ὦ ξέν' ; εἰπέ, παρὰ φίλου γὰρ ὦν
 „ 797. πολλῶν ἂν ἦκοις, ὦ ξέν', ἄξιος τυχεῖν
 „ 1112. τί δ' ἔστιν, ὦ ξέν' ; ὥς μ' ὑπέρχεται φόβος.
 „ 1180. οὐ δὴ ποτ', ὦ ξέν', ἀμφ' ἐμοὶ στένεις τόδε ;
 „ 1305. αὐτὴ μέγ' εὐρεῖν κέρδος· οὐ γὰρ ἂν καλῶς
 Philoct. 232. ἀλλ', ὦ ξέν', ἴσθι τοῦτο πρῶτον, οὐνεκα
 „ 348. ταῦτ', ὦ ξέν', οὕτως ἐννέποντες οὐ πολὺν
 „ 422. κείνων κάκ' ἐξήρυνξε
 „ 1137. . . . ὅσ' ἐφ' ἡμῖν κάκ' ἐμήσατ', ὦ Ζεῦ.
 Frag. 218. [οἴπερ] ξυνέλεγον τὰ ξύλ', ὥς ἐκ καυμάτων
 „ 518. . . . μί' ἔδειξε πατρὸς καὶ μητρὸς ἡμᾶς
 „ 675. μικροῦ δ' ἀγῶνος οὐ μέγ' ἔρχεται κλέος.

It will be seen that in no case does the elision come before a stop fuller than a comma in Aeschylus ; and in Sophocles only in six places before a colon ; never before a full stop. On O. R. 957, I have already commented. In *ibid.* 931, and El. 662, it is easily seen that there is no real pause in the sense, and no need for a fuller stop than a comma. O. C. 835 might quite as well run τί δρᾶς ; ὦ ξέν',

οὐκ. To El. 671 the observation applies which I made on O. R. 957. El. 1112 requires a closer examination. In Soph. O. R. 319, Professor Kennedy holds that we should read, not

τί δ' ἔστιν ; ὥς ἄθυμος εἰσελήλυθας,

but

τί δ' ἔστιν, ὥς ἄθυμος εἰσελήλυθας,

and render, not 'What is it? how dejectedly thou comest,' but '*What ails thee that* thou comest so dejected?' In the same way here (El. 1112) we should read

τί δ' ἔστιν, ὦ ξέν', ὥς μ' ὑπέρχεται φόβος,

'What ails me that I feel this strange alarm?' Thus, the elision of ξέν' is completely justified, and the justice of Dr. Kennedy's acute observation on O. R. 319 is further illustrated.

Mr. Verrall says that in Euripides the exceptions are more numerous, and, as far as he can judge, more arbitrary; but the general rules are still the same. A study of the following table will show that Euripides and the author of the *Rhesus* can hardly be said to conform to Mr. Verrall's rules; whereas in more than eighty instances of a pyrrhic word elided there is only one case where Dindorf prints a full stop after the elided word (Ion, 26)—

τρέφειν τέκν'. ἀλλ' ἦν εἶχε πάρθενος χλιδήν.

Here the most cursory glance at the passage shows that τέκν' ends a parenthesis, and should not be followed by a full stop at all. The long parenthesis which ends with τέκν' required to be rapidly pronounced, and should have been stopped off with commas or brackets, just as σάφ' ἴσθι, οὐχ ὀρᾷς, πῶς δοκεῖς, and such expressions, are invariably treated. The passage is :—

κείνῃ γὰρ ἡ Διὸς κόρη
φρουρῶ παραλεύξασα φύλακε σώματος
δισσὼ δράκοντε, παρθένοις Ἀγραυλίσσι

δίδωσι σώζειν (ὄθεν Ἑρεχθείδαις ἐκεί
νόμος τίς ἐστιν ὄφεισιν ἐν χρυσηλάτοις
τρέφειν τέκν') ἀλλ' ἦν εἶχε παρθένος χλιδὴν
τέκνῳ προσάψας' ἔλιπεν ὥς θανουμένην

A colon will be found after the elision in Dindorf's text in Hippol. 315, Androm. 419, Troad. 41, Heraclid. 939, Herc. Fur. 318, El. 1120; but in none of these places is there any real pause in the sense, or any pause greater than would be fully denoted by a comma. The same may be said of ὦ ξέν', which will be found before a colon in Ion 514, and before a note of interrogation in El. 831.

EURIPIDES.

Rhesus	452. ἐγὼ γὰρ ἔξω τοὺς μέγ' αἰχλῶντας δορί.
"	811. μέγ' ἄρ' ἐμοὶ μέγ', ὦ πολίοχον κράτος,
Alcestis	253. ἔχων χέρ' ἐπὶ κοντῷ Χάρων μ' ἤδη καλεῖ
"	346. οὐτ' ἂν φρέν' ἐξαίροιμι πρὸς Λίβυν λακεῖν
Medea	901. ἄρ', ὦ τέκν', οὕτω καὶ πολλὸν ζῶντες χρόνον
"	969. ἀλλ', ὦ τέκν', εἰσελθόντε πλουσιόους δόμους
"	1029. ἄλλως ἄρ' ὑμᾶς, ὦ τέκν', ἐξεθρεψάμην
Hippol.	315. φιλῶ τέκν'. ἄλλη δ' ἐν τύχῃ χειμᾶζομαι
"	327. κάκ', ὦ τάλαινα, σοὶ τάδ', εἰ πεύσει κακά.
Androm.	95. ἀνὰ στόμ' αἰεὶ καὶ διὰ γλώσσης ἔχειν.
"	210. ἡ Δάκαινα μὲν πόλις μέγ' ἐστι, . . .
"	419. πᾶσι δ' ἀνθρώποις ἄρ' ἦν ψυχὴ τέκν'. ὅστις δ'
"	541. ἐπεὶ τοι μέγ' ἀναλώσας ψυχῆς μόριον
"	814. οὕτω μέγ' ἀλγεῖ, καὶ τὰ πρὶν δεδραμένα
Troades	41. φροῦδος δὲ Πρίαμος καὶ τέκν'. ἦν δὲ παρθένον
"	259. σὺ γὰρ μέγ' αὐτῇ βασιλικῶν λέκτρων τυχεῖν;
"	466. ἔἴτ' ἐμ', οὐτοὶ φίλα τὰ μὴ φίλ', ὦ κόραι.
"	660. καίτοι λέγουσιν ὥς μί' εὐφρόνῃ χαλᾷ
"	668. σὲ δ', ὦ φίλ' Ἑκτορ, εἶχον ἄνδρ' ἀρκοῦντά μοι
Hecuba	166. ὦ κάκ' ἐνεγκοῦσαι Τρωάδες, ὦ
"	167. κάκ' ἐνεγκοῦσαι
"	506. δοκοῦν Ἀχαιοὺς ἡλθες; ὥς φίλ' ἂν λέγοις.
"	1071. πᾶ πόδ' ἐπ' ἄξας

- Hecuba 1075. ποῖ, πᾶ φέρομαι τέκν' ἔρημα λιπών
 Orestes 126. ὦ φύσις, ἐν ἀνθρώποισιν ὥς μέγ' εἰ κακόν.
 „ 264. μέγες μί' οὐσα τῶν ἐμῶν Ἑρινύων.
 „ 632. Μενέλαε, ποῖ σὸν πόδ' ἐπὶ συννοίᾳ κυκλεῖς;
 „ 1338. σῇ μητρὶ προσπεσούσα τῇ μέγ' ὀλβίᾳ
 Phoenissae 541. καὶ γὰρ μέτρ' ἀνθρώποισι καὶ μέρη σταθμῶν
 „ 550. τιμᾶς ὑπέρφενυ καὶ μέγ' ἡγησάμενος τόδε
 „ 1191. ἱππης, ὀπλῖται, κᾶς μέσ' Ἀργείων ὄπλα
 „ 1279. οἶ' γῶ, τί λέξεις, μήτηρ; οὐ φίλ', ἀλλ' ἔπου.
 „ 1285. τρομερὰν φρίκα τρομερὰν φρέν' ἔχω
 „ 1300. μονόμαχον ἐπὶ φρέν' ἡλθέτην.
 „ 1465. οἱ δ' εἰς ὄπλ' ἦσσον· εὐ δέ πως προμηθία
 „ 1699. πρόσθε τυφλὴν χέρ' ἐπὶ πρόσωπα δυστυχῇ.
 Supplices 545. ταφέντες ὑμῶν; ἡ τέκν' ἐν μυχοῖς χθονὸς
 Heracleid. 307. δότ', ὦ τέκν', αὐτοῖς χεῖρα δεξιάν, δότε
 „ 353. εἰ σὺ μέγ' αὐχεῖς, ἕτεροι σοῦ πλόν
 „ 801. κατὰ στόμ' ἐκτείνοντες ἀντετάξαμεν
 „ 939. τέρψαι θέλοντες σὴν φρέν'. ἐκ γὰρ εὐτυχούς
 Herc. Fur. 227. τὰ δ', ὦ τέκν', ὑμῖν οὔτε Θηβαίων πόλιν
 „ 301. ῥᾶον γὰρ αἰδοῦς ὑποβαλὼν φίλ' ἂν τύχοις.
 „ 318. σῶσαι τέκν'. ἄλλως δ' ἀδυνάτων ἔοικ' ἐρᾶν.
 „ 492. θνήσκει πατήρ σὸς καὶ τέκν', ὀλλύμαι δ' ἐγώ.
 „ 520. δεῦρ, ὦ τέκν', ἐκκρήμνασθε πατρῶων πέπλων.
 „ 622. ἀλλ' εἴ', ὁμαρτεῖτ', ὦ τέκν', ἐς δόμους πατρί
 „ 712. ποῦ δῆτα Μεγάρα; ποῦ τέκν' Ἀλκμήνης γόνου;
 „ 896. φυγῇ, τέκν', ἐξορμᾶτε· δάϊον τόδε.
 „ 1136. τί φῆς; τί δράσας; τί κάκ' ἀγγέλλων πάτερ.
 „ 1289. οὐχ οὗτος ὁ Διός; ὅς τέκν' ἐκτείνεν ποτε
 Ion 26. τρέφειν τέκν'. ἀλλ' ἦν εἶχε παρθένος χλιδὴν
 „ 264. 266. 312. 360. 392. 514. ὦ ξέν',
 „ 613. ἡ δ' οὐσ' ἄτεκνος τὰ σὰ φίλ' εἰσορᾷ πικρῶς,
 „ 1428. δώρημ' Ἀθάνας, ἡ τέκν' ἐντρέφειν λέγει;
 Helena 105. 151. 476. 1436. 1579. ὦ ξέν',
 „ 590. λείψεις γὰρ ἡμᾶς; τὰ δὲ κέν' ἐξάξεις λέχη;
 „ 770. μύθων, λέγων τ' ἂν σοι κάκ' ἀλγοῖην ἔτι.
 „ 815. μί' ἐστὶν ἐλπίς, ἣ μόνῃ σωθεῖμεν ἂν.
 „ 872. ἐφέστιον φλόγ' ἐς δόμους κομίζετε.
 „ 1598. ὁ δὲ ζύγ' ἄξας, ὁ δ' ἀφελὼν σκαλμοῦ πλάτην.

Helena	1614. καθῆκ' ἑμαντὸν εἰς ἄλ' ἄγκυραν πάρα.
Electra	139. Ἄργει κέλσας πόδ' ἀλάταν.
"	180. εἰλικτὸν κρούσω πόδ' ἐμόν.
"	265. 288. 332. 831. ὦ ξέν',
"	337. ὁ δ' ἀνδρ' ἐν' εἰς ὧν οὐ δυνήσεται κτανεῖν.
"	337. ἀλλ' εἰς ὅπλ' ἔλθω; τίς δὲ πρὸς λόγχην βλέπων
"	451. ταχύπορον πόδ' Ἀτρεΐδαις
"	950. τὰ γὰρ τέκν' αὐτῶν Ἄρεος ἐκκρεμάννυνται
"	1120. φρονεῖ μέγ'. ἐν γὰρ τοῖς ἐμοῖς ναίει δόμοις.
Bacchae	263. 441. 1059. ὦ ξέν',
"	267. καλὰς ἀφορμάς, οὐ μέγ' ἔργον εἰ λέγειν.
"	292. ῥήξας μέρος τι τοῦ χθόν' ἐγκυκλουμένου
"	647. στήσον πόδ', ὀργῇ δ' ὑπόθεες ἤσυχον πόδα.
Iph. Taur.	1145. παρὰ πόδ' εἰλίσσουσα
"	1322. μὴ ἵνταῦθα τρέψῃς σὴν φρέν', ἀλλ' ἀκουέ' μιν.
Iph. Aul.	326. ἀ σὺν κάκ' εἰργάσω λάθρα.
"	1027. ἐλθοῦσαν εὐρεῖν σὴν χέρ' ἐπικούρον κακῶν.
Cyclops.	102. 548. 566. ὦ ξέν',
"	555. 558. 560. 586. ναὶ μὰ Δί',
Fragm. Alcmeon	68. τό τε στόμ' εἰς ἐκπληξιν ἀνθρώπων ἄγει
" Erchth.	364. ἀλλ', ὦ τέκνον, μοι δὸς χέρ', ὥς θίγη πατήρ.
" Ino.	424. ὥς μικρὰ τὰ σφάλλοντα, καὶ μί' ἡμέρα
" Oedip.	551. ἐνὸς δ' ἔρωτος ὄντος οὐ μί' ἡδονή.
" Phaethon	775. ἔχειν χρὴ στόμ' ἐν ἡσυχίᾳ.
" Chrysippus	839. γνώμης σόφισμα καὶ χέρ' ἀνδρείαν ἔχων
" Incert.	κορυφῇ δὲ θεῶν ὁ περὶ χθόν' ἔχων.

To these add—

κάλ'	Hipp. 610. (No stop.)
φρέν'	Hipp. 1120. (No stop.)
ἐν'	Andr. 178; Hel. 732. (No stop.)
πόδ'	Tro. 325; Bacch. 437; Hel. 980. (No stop, comma, no stop.)
χέρ'	Ion, 132. (No stop.)
μί'	Iph. A. 1390. (No stop.)
ὦ ξέν'	Iph. A. 855. (Comma.)
Δί'	Cycl. 212. (No stop.)

It will be observed that in none of these cases does the elided pyrrhic precede a pause in the sense, and in no case is a fuller stop than a comma used in the text.

I have not observed ξέν' without ᾤ in Euripides, though ξέν' is very common when preceded by ᾤ. But we have met above ξέν' elided though not preceded by ᾤ in Soph. O. R. 957, O. C. 824, 877, 1206.

ROBERT YELVERTON TYRRELL.

EMENDATIONS.

I.

κείνος γὰρ Ὀλυμπιονίκος ἔων Αἰακίδαις
 ἔρνεα πρῶτος ∪ — ∪ ἀπ' Ἀλφεοῦ
 καὶ, κ. τ. λ.

Pindar, *Nem.* 5, 17.

A verb is required equivalent to 'won,' 'obtained.' Bergk supplied *ἔνεικεν*, Hartung *ἰδρέψατ'*, either of which will satisfy both sense and metre; but there is no apparent reason why either should have fallen out. If we can find a suitable word whose loss can be accounted for, it may evidently claim a certain probability, which other words as mere guesses cannot. I propose to read *ἔτοσσευ*; its loss is explained by the vicinity of *πρῶτος*. For this uncommon word see Pindar, *Pyth.* 3, 27, *τόσσαις* (participle); 4, 25, *ἐπέτοσσε κρημνάντων*; 10, 52, *ἐπιτόσσαις θεωρέζοντας*. Notice that *ἐπιτ.* may be used with genitive or accusative.

II.

Ἴων. κάπειτ' ἔκαινες φαρμάκοις τὸν τοῦ θεοῦ;
 Κρε. ἀλλ' οὐκέτ' ἦσθα Λοξίου πατρὸς δὲ σοῦ.
 Ἴων. ἀλλ' ἐγενόμεσθα πατρὸς δ' οὐσίαν λέγω.

Euripides, *Ion*, 1286, sq.

The last line is unmetrical, but no change is required except the removal of δ'. Editors have strangely missed the point of this passage, and many conjectures have been proposed, the latest being that of Madvig (*πατρὸς ἐν οὐσίᾳ, νεώ*).

The point of the lines rests in the ambiguity of the words τὸν τοῦ θεοῦ, by which Ion means ‘him who belongs to the god,’ but Kreousa understands ‘the son of the god,’ and objects, ‘But when I made this attempt by poison upon your life you were no longer the (son) of Loxias, but the (son) of your real father, Xanthos.’ To this Ion replies: ἀλλ’ ἐγενόμεσθα πατρός· οὐσίαν λέγω, ‘the relation I bear to my father Xanthos is that of γένεσις, whereas I am speaking of οὐσία’; that is, ‘I meant by τὸν τοῦ θεοῦ not τὸν τοῦ θεοῦ παῖδα (which would not be true, I grant you), but τὸν τοῦ θεοῦ ὄντα, in the sense of property.’

δ’ would be a very natural insertion of a copyist who did not understand the point and was ignorant of metre.

III.

ἧ γὰρ θάνης σὺ καὶ τελευτήσας ἀφῆς,
ταύτῃ νόμιζε κάμει τῇ τόθ’ ἡμέρα
βία ξυναρπασθεῖσαν, κ. τ. λ.

Sophokles, *Aias*, 496.

ἀφῆς is certainly wrong. Madvig proposes ἀπῆς; but then there will be no less than three words in the line meaning just the same thing—‘when you die and are dead and gone.’ Besides, the corruption of π into φ is not so likely as the omission of a letter, which I would assume, and read ταφῆς, ‘when you are dead and buried.’ τελευτήσας is unnecessary, but not objectionable, and suggests the logical consecution of death and burial.

On l. 1012 of this play

οὗτος τί κρίψει; πόλον οὐκ ἐρεῖ κακὸν,
τὸν ἐκ δορὸς γεγῶτα πολεμίου νόθον;

Madvig says: ‘Perinepte, qui ex captiva natus sit, ex hasta hostili natum dici manifestum est,’ and proposes

σπόρου, a not very likely corruption. While I question whether this be too strong an expression for Sophokles (= 'born of a mother captured in war'), I would suggest—

τὸν ἐκ δρυὸς γεγῶτα, πολέμον νόθον;

The proverbial expression is used of one who is not to be counted a human being, and would be here equivalent to *μηδὲν ὦν γοναῖσιν* (l. 1074).

IV.

οὐκ ἔστι τὸν λάβρα τι ποιοῦντα ὦν συνέθεντο πρὸς ἀλλήλους εἰς τὸ μὴ βλάπτειν μηδὲ βλάπτεσθαι, πιστεύειν ὅτι λήσει κἂν μυριάκις ἐπὶ τοῦ παρόντος λανθάνῃ· μέχρι γὰρ καταστροφῆς ἀδηλον εἰ καὶ λήσει.—
DIOGENES LAERTIUS, lib. x. 151.

The corruptness of the text of Diogenes Laertius rivals the inelegance of his Greek; and after all Cobet's labours much remains to be done. In this passage (No. 37 of Epicurus' *κυρίαι δόξαι*) we require, instead of *ποιοῦντα*, a word meaning 'transgressing' or 'infringing.' Madvig proposed *κινουῦντα*. But it is palaeographically easier to emend

πατοῦντα.

V.

Μολπίς· ἐλπίς.—HESYCHIUS.

This gloss is often used to support the untenable theory of an interchange between *m* and *v*. It is certainly corrupt. If we found *μολπίς* alone without an interpretation, the obvious conjecture would be that it was an Aeolic form (wrongly accented), bearing to *μολπή* the same relation that *ὄλπις* (Sappho) bears to *ὄλπη*, 'a flask.' And this

I believe to be the fact. I would restore the gloss thus :

Μόλπις. μολπή. Αιολεῖς.

ἐλπής is a corruption of Αιολεῖς; μολπή fell out from similarity to μόλπις (accent so).

VI.

ἀ δὲ ~~Ἰ~~δρως κακχέεται, τρόμος δὲ, κ. τ. λ.

SAPPHO, 2, 13.

Under the false impression that μ and Φ are interchangeable, Bergk has spoiled the text of this ode in the 4th edition of his *Poetae Lyrici Graeci* by reading $\mu\acute{\iota}\delta\rho\omega\varsigma$, an impossible form. The manuscripts of Longinus are very corrupt; the Aeolic dialect puzzled the copyists sorely. They all read $\mu' \acute{\iota}\delta\rho\omega\varsigma$, and also import the word $\psi\chi\rho\acute{o}\varsigma$ into the line, which not only destroys the metre but is a wrong gender, for the Aeolians said $\acute{\alpha} \acute{\iota}\delta\rho\omega\varsigma$, as a grammarian tells us expressly. The μ' may have been an insertion *metri gratia* after the loss of digamma; but I would suggest as a possibility that we may have here a still older form before us. \mathcal{M} may have sprung from a Σ written askew (as we often see on old inscriptions), and Sappho may have written

ἀ δὲ $\sigma\acute{\iota}\delta\rho\omega\varsigma$ κακχέεται.

The original form was $\sigma\Phi\acute{\iota}\delta\rho\omega\varsigma$, which might lose either σ or Φ : cf. $\sigma\acute{\iota}\gamma\acute{\alpha}\omega = \sigma\Phi\acute{\iota}\gamma\acute{\alpha}\omega$.

$\acute{\iota}\delta\rho\omega\varsigma$ suggests an etymological remark. It is generally considered the same as *sudor* in root merely, but not in termination; but they are really completely identical. It is a very common phenomenon for one of two liquids in the same word to fall out; e.g. $\phi\alpha\upsilon\lambda\omicron\varsigma = \phi\lambda\alpha\upsilon\lambda\omicron\varsigma$, as is proved by $\phi\lambda\alpha\upsilon\rho\omicron\varsigma$; $\pi\acute{\upsilon}\epsilon\lambda\omicron\varsigma$ for $\pi\lambda\acute{\upsilon}\epsilon\lambda\omicron\varsigma$; probably *increbesco*. *Sudor* is for *sudror*, which was originally *sudros*; and the Graeco-Italic form was *svidrós*. *Agrestis* (wrongly

compared with ἀγρώστis, which has a quite different meaning) is, I think, another instance; it is for *agrestis* of the same formation as *silvestris*, *campestris*; the termination to be compared to ὀρέσ-τερος.

VII.

Vale, puella, iam Catullus obdurat,
nec te requiret nec rogabit invitam :
at tu dolebis, cum rogaberis nullei.
scelestā † ne te † quae tibi manet vita !

CATULLUS, 8, 12, sq.

vae te is usually read for *ne te*; but there seems no reason why *vae te* should have been corrupted. I propose

scelestā, *anenti* quae tibi manet vita !

The initial *a* was omitted after final *a* of *scelestā*, and the meaningless *nenti* became further corrupted. For the rare *anero* cf. Plautus Merc. 4, 4, 15, where Ritschl emended *verum hercle anet* for *virum hercle avet*. In 4, 26, Catullus has *senet quiete*: *senere* is chiefly confined to the early dramatists, but also occurs in Persius 6, 6. For the sentiment compare Propertius, II. 18, 19.

VIII.

isque domum nobis isque dedit dominae (MSS. dominam),
†ad quam communes exerceremus amores.—CATULLUS, 68, 68.

ad quam is corrupt. *ut clam* (not bad) has been proposed, and *cum qua* (*qua cum* would be better). But I think l. 156 leads us to the true reading. There the MSS. give

et domus in qua lusimus et domina,

and all editors (after some interpolated MSS.) fill up the

gap with *nos* after *in qua*, which is evidently correct. So in this passage we should read *qua nos*. The *m* may be a trace of an abbreviated *nos*.

IX.

atqui nec divis homines componier aequum est,
ingratum tremuli tolle parentis onus.

CATULLUS, 68, 141.

The second line makes no sense, being utterly irrelevant both to what precedes and to what follows. Editors have supposed a *lacuna* between these two lines, but the irrelevancy remains. It seems to me certain that the second line is corrupt, from the train of thought in the context. 'Though Lesbia is not content to have no lovers but Catullus, I am ready to bear lightly a few infidelities. It is a fool's part to take such matters too seriously, for Juno, the great goddess, knows how to suppress her wrath at Jupiter's amours. And yet it is not fair to put gods and men on a par; *it is a hard thing for a MAN to have to endure a WIFE'S infidelity*. Yet Lesbia is not my wife; I have no such claim on her, and should be grateful for the smallest favour.' The words in italics give the tenor of the line that has been corrupted into *ingratum tremuli tolle parentis onus*. That this is the sense of the passage seems plain from *aequum est*, which must mean 'it is not fair to men.' Can we restore the corrupt line? Partly, I think. *ingratum t* is for *ingratumst*, and *remuli* is a corruption of *mulier*. *Parentis* was probably imported owing to *dextra deducta paterna* in the following line. The original line was something like this—

ingratum est mulier perfida amantis onus,

'in a false wife a lover has an ungrateful burden'; *amantis* referring to the husband; but Catullus is of course think-

ing of himself. Any restoration of the second half of the line must be pure conjecture. *tollere perfida onus* might also be suggested.

X.

Inde exspecto equidem ΑΛΛΑΤΕΑΝ illam tuam.

CICERO, *ad Att.* IX. 18. 3.

Cicero was expecting a letter from Atticus to give him advice in his political emergency (*nunc certe promenda tibi sunt consilia*). λαλαγεῦσαν and παταγεῦσαν are very bad conjectures; and Boot's διατελοῦσαν is not very satisfactory. I propose—

ἐξ ἀδύτου λέγουσαν,

‘I am waiting for your letter, Sir Oracle.’

XI.

† Maconi istud quod scribis non mihi videtur tam re esse triste quam verbo. Haec est ἄλη, in qua nunc sumus, mortis instar.—CICERO, *ad Att.* X. 1, 4.

For *maconi* have been suggested *medicamentum* and *φάρμακον*. Nearer to the MSS. would be ἀκόνιον, a poison which must have had a certain prestige with philosophers, inasmuch as Aristotle is said to have used it (Diogenes Laert. 5, 6); or else κώνειον.

For ἄλη, *in qua*, Boot corrects ἀνάληψις. *In quo*, &c., to suit his emendation φάρμακον. But it is more admissible to infer from the second sentence that a *poison* was mentioned in the first, and emend accordingly.

[Mr. L. Purser has since communicated to me a conjecture of his, μηκόνιον, or μηκωνεῖον, ‘opium,’ which is palaeographically excellent.]

XII.

Ne hercule ego quidem reperio quod scribam. Sedeo enim *πλουδοκῶν*. Etsi nihil unquam tam fuit scribendum, &c.—CICERO, *ad Att.* x. 8, 9.

πλουδοκῶν is a barbarous word, and, as Boot observes, supplies no reason for having nothing to say. Read *sedeo enim nuntium καραδοκῶν*. In XIII. 10, 3, there is, I think, another instance of *nuntium* falling out after *enim*: 'Hodie Spinttherem exspecto. Misit enim Brutus ad me: per literas purgat Caesarem de interitu Marcelli,' &c. Brutus had nothing to do with Cicero's expectation of Spintther's arrival; accordingly, Orelli reads *etiam* for *enim*, and Boot proposes *Misit enim ad me. Brutus*, &c. But we should read *Misit enim nuntium. Brutus ad me*, &c. *Nuntium* was probably written in an abbreviated form, of which the *ductus litterarum* was similar to *nim*.

For *καραδοκῶν* compare IX. 10, 'commodissime enim τὸ μέλλον ibi καραδοκήσεις.

This reading renders *enim* intelligible: Cicero has nothing to say till he gets more news.

[Since I wrote the above, Mr. Purser pointed out to me that *epistolam καραδοκῶν* is more probable than *nuntium*; *epistola* was abbreviated to *epla*, and this accounts perfectly for *πλουδοκῶν*.]

XIII.

Epistola tua gratissima fuit meae Tulliae et mehercule mihi Semper †secum aliquam afferunt tuae literae.—CICERO, *ad Att.* x. 13, 1.

Boot would read *speculam* for *secum*. Perhaps *παρὰ ψυχὴν*: *par* might fall out owing to *-per* of *semper*, and *apsuchen* become *secum*.

XIV.

De Terentia ita cura, ut scribis, meque hac ad maximas aegritudines accessione non † maxima libera.—CICERO, *ad Att.* XI. 23, 2.

Boot approves of *minima* for *maxima*, but such a corruption is unlikely. I take it that *accessione ne* was written by dittography, and that the unmeaning *ne* was corrected to *non*. Read *accessione maxima libera*.

XV.

Quidquamne me putas curare in † toto nisi ut ei ne desim.

CICERO, *ad Att.* XIII. 20, 4.

In foro and *in vita* have been proposed for *in toto*. Better *curare re in tota*.

XVI.

Male mi sit, si unquam quidquam tam enitar † ergo at ego † ne Tironi quidem dictavi, &c.—CICERO, *ad Att.* XIII. 25, 3.

Boot, *tam enitar*. *Ergo ne*, &c. Usual reading, after Bosius, is Ἐργον. *At ego ne*, &c. We might suggest—

Male mi sit, si unquam quidquam tam enitar. Ἐργον ἐπ' ἔργῳ. *Ne Tironi*, &c.

Compare Theocritus, XV. 20.

XVII.

Volo aliquem Olympia † aut ubi visum πολιτικὸν σύλλογον more Dicaearchi, familiaris tui.—CICERO, *ad Att.* XIII. 30, 3.

Boot proposes *Olympicum aut Isthmicum*, as Dicaearchus composed dialogues in which the conversation was supposed to have taken place at Olympia and at Corinth. But in others the scene was laid in Lesbos (see Tusc.

Disp. I. 77). *Ubi*, I think, is the residue of *Lesbi* and *visum* of *habitum*—

Olympiae aut Lesbi habitum.

XVIII.

Adnueram, sed pompa videret.

CICERO, *ad Att.* XIII. 44.

sed pompa me deterret is Orelli's reading, approved by Boot. Perhaps it would be palaeographically easier to read *sed pompam aveo videre*; *pompam* was written *pompā*. Mr. Purser suggests *viderem*.

XIX.

Quid tibi non erat meretricum aliarum Athenis copia,
Quibuscum haberes rem, nisi cum illa quam ego mandassem tibi,
Occiperes tute amare et mi ires consultum male.

PLAUTUS, *Bacchides*, 563.

To remedy the defective metre of the third line, Ussing reads,

Eam ut occiperes tute amare,

but this does not explain the corruption.

Read—

Occiperes *ut tute eam* amare.

Ut and *eam* dropped out owing to the similar letters adjacent.

JOHN B. BURY.

ON THE CRITICISM OF CICERO'S *EPISTOLAE
AD FAMILIARES*.

LAST September I made a collation of the Harleian MS. (No. 2773) of Cicero's *Epistolae ad Familiares*, in the interest of the second volume of Professor Tyrrell's edition of Cicero's *Correspondence*; and I saw clearly that all the statements which had been made, from Oehler in 1839 to Rühl in 1875, had certainly not exaggerated the importance of this MS. as an authority independent of the Medicean. A full account of the Harleian MS., the Tours MS., and a Paris MS., and their relation to one another and to the Medicean, has since been given in a very complete and masterly paper published among the *Commentationes Philologicae Jenenses*, vol. iii. (pp. 99-214), by Oscar Streicher. That paper has given the death-blow to Orelli's theory that the Medicean is our sole original authority for the criticism of the *Epp. ad Fam.*, and has rendered the problem a much more complex one than the great Zurich scholar had supposed. Streicher's work has distinctly formed an epoch, and his elaborate treatment and solution of the question as to the relations of the MSS. merit our warm and hearty admiration. It is, of course, in the hands of every scholar to whom the criticism of Cicero's Letters is of any interest. In the following pages I hope to add a few matters of detail to Streicher's article: his main theory of the relations of the MSS. is, in my opinion, quite unassailable.

But first let me correct a few errors of statement that Streicher has made; they are very few indeed, considering the length of the paper, and eminently such as, in the words of Horace, *humana parum cavit natura*. Page 112, l. 39, H reads *inicia*, not *inuicia* (I. 7. 8); p. 113, l. 19, *subiacent quae* for *subiice atque* (IV. 5. 5); l. 25, *ubi usquam*, with an erasure between the *i* and *u* (VI. 1. 1); l. 26, *cui'uis* for *cuiuis* (VI. 6. 9); l. 35, *aut. i. a me* (VII. 13. 1); p. 114, l. 18, it should be printed *debebat* (I. 1. 4); l. 20, H has not *ui* (II. 4. 1); l. 33, there is no *quod ad* in the section referred to (VI. 20. 2), but there is a *quod cuique* for *quocunque*; l. 34, H has *uel iam*, not *uel am* (VII. 19); p. 115, l. 4, *istic*, not *ista* (II. 12. 2); l. 31, *quod ii* should be italicized as far as H is concerned; p. 116, l. 7, H has *me ratio* (V. 20. 7); l. 32, *quod* is expressed (V. 13. 3); l. 33, *est* is found, thus (÷) (V. 13. 4); p. 117, l. 28, *audiui* is crossed out in H (IV. 2. 1); p. 129, l. 32, H has *tua* also (IV. 5. 5); l. 36, *dolore se tangere*, not *dolores et angere* (V. 14. 2); p. 130, l. 23, H also has *coniunctum esset* (IV. 9. 2); l. 26, H has *explicare* (V. 21. 2); l. 30, H has *excitari* (VI. 6. 4); p. 133, l. 21, for *quod*] *quid* M¹ read *quid*] *quod* M¹ (II. 17. 5); p. 136, l. 12, M reads *tenuissem* (VIII. 1. 2); l. 19, after *scaturrit* add (*priore r deleta*) (VIII. 4. 2); p. 137, l. 1, M¹ has *cumulando atque* (II. 6. 2); l. 20, H has *carissimi* (IV. 5. 1); l. 27, H has *si liberis* (V. 16. 6); p. 154, l. 27, H has *maiores*, not *maliores* (IV. 9. 3); p. 173, note (l. 2), H reads *inhonorabile* (thus *ī honorabile*) (V. 21. 5); p. 179, note, l. 1, *dampnis*, H (I. 9. 5); l. 2, *delectationis*, H (VII. 1. 6); l. 4, *peropurtunam*, H (VI. 6. 6); p. 185, l. 28, H reads *quae ante profecto quaeque* (III. 10. 11).

To come to the MSS. themselves. It is quite impossible that H could have been copied from T (the Turonensis), because this latter leaves out all after VII. 32. 1, *sestiana in*, and from II. 16. 4 to IV. 3, near the end, *colat*; and even in the parts found in both MSS., in addition to the many

examples adduced by Streicher, H preserves the right reading, which is omitted by T in the following. I take 11 out of a list of 272 passages where T *omits* the right reading, and H retains it: neque ualde . . . uolebant (I. 2. 2); nec . . . uideamur (I. 5a. 3); vel in remunerando (II. 6. 2); latebras . . . nostra (II. 16. 2); ea perspicias . . . non minus (IV. 5. 1-2); -ri (in oppugnari) . . . istum (V. 2. 6); ego quae . . . sum (V. 5. 3); utantur (V. 8. 5); qua . . . re (VI. 7. 1); me . . . fieri (VI. 10. 1); maximam ranunculorum se (VII. 18. 4). T suffers very severely from the *corruptio ex homoeoteleuto*, as can be seen even from these passages.

That the copyist of H could by any means have emended such passages as these is out of the question. He copies what he finds before him, generally giving words that are Latin, but which make no sort of sense, such as II. 4. 1: ut rome minus deceat uti non intellegat cerne. Tecum per litteras, which we find in H (as in M), for: utro me minus deceat uti non intellego. Iocerne tecum per litteras; and his punctuation is often quite worthless, e.g. I. 2. 1. He punctuates: reducerent. secunda hortensii ut tu sine exercitu reduceres tercia volcacii. ut, &c. In point of literary capacity he is quite on a level with the men of the twelfth century, who were not scholars at all (cf. Thurot, p. 4).

Again, T was not copied from H; for, in addition to the evidence on this point brought forward by Streicher (p. 116), we find that H omits the following words, which are found in T:—ualde (I. 3. 1); rebus (I. 3. 2); multo (4. 1); profecto (5a. 2); erga te (9. 1); obscuro (II. 5. 1); agam (9. 1); tuam erga me (V. 3. 2); non possis (4. 2); forensibus (8. 5); Q. Leptam (20. 4); affectum esse (21. 1); debebamus . . . non modo (21. 4); solere (VI. 1. 6); praesertim (3. 2); non solum (4. 3); potius (4. 4); a Pompeio (5. 6); habent (6. 8); corpore (7. 4); capiatur (7. 5);

placeat (8. 1); liberis . . . scribas (10. 1); satis opportune (12. 2); cum his omnibus (12. 2); aetatis (12. 4); et perpetua (13. 2); meum, opere (18. 4); et diligunt (20. 3); habent (VII. 1. 2); iis, incommodis (3. 3); omnia quae (5. 3); propter *before* occupationem (10. 1) emisse (23. 1); digna (23. 1); audisses (26. 2); -nim me *before* nauseantem (26. 2); quanquam me (28. 3); scribas (30. 2); fruitur (30. 2); dari (31. 1); and eighty-six more which I noted.

H and T, then, are independent of one another. But are H and M independent? No doubt. For example, the copyist of H could not possibly have emended the wrong reading in M to the right reading that H displays in the three passages especially emphasized by Thurot (p. 7), as showing the independence of M and T, viz. IV. 6. 3; IV. 12. 2; VI. 1. 6. The matter is, however, an important one as bearing against the theory of Orelli; so that it may, perhaps, be advisable to give *all* the other instances, in addition to the 'no despicable list' given by Streicher (pp. 132-138), in which I have noticed that H preserves the right reading, which has been corrupted in M. (The reading before the bracket in each case is that of H; the one after that of M. The first hand of M is expressed by M¹.)

I. uolcacium] uolgacium M¹ (1. 3); consumi] consummi M¹ (2. 2); is] his M¹ (3. 1); ne] nec M¹ (3. 2); qui nesciat] quin sciat M¹ (4. 2); romani] romano M¹ (4. 3); regia] regi M¹ (5a. 3); positam] positame M¹ (5a. 4); quam tibi] quantibi (5a. 4); hominis] homines M¹ (5b. 2); ad eam] eam M¹ (56. 2); hortensium] hortesium M¹ (5b. 2); is] his (7. 1); officii] auficii M¹ (7. 3); praestitisset] praestetisset (7. 6); ferat] fuerat M¹ (7. 6); obliti] oblitis M¹ (7. 7); quae] qui M¹ (7. 8); tamen ne nimis] tamene nimis M¹ (7. 8); beneficii] beneficentiis (7. 9): ut quae illi] ut que illi (8. 2); possum] possim (8. 6); collocutionibusque] conlocationibusque M¹ (9. 4); coegissent] cogissent M¹ (9. 7); stoma-

chum] sthomacum M¹ (9. 10); citeriorem] citeriorum M¹ (9. 13); daret cum] daret quem (9. 16); cantatum] catatum M¹ (9. 19).

II. nulla] ulla M¹ (1. 2); Rupe] nempe M (3. 1); sententiam] sentiam (3. 1); et una, *not repeated* (5. 1); gratiosorum] gratiosum (6. 3); feliciter] filiciter (7. 3); diligo] deligo M¹ (9. 3); gratulationis] gratulationes (10. 1); diuortii] diuertiis (10. 2); uigila] uigilia (10. 4); molestiis] molestis (12. 1); diogenes] diogenus (12. 2); una mehercule] unam hercule (12. 2); uiuam] uiua (13. 3); maiis] mais (13. 3); militemque] militareque (13. 3); ipsa republica] ipsa respublica M¹ (15. 3); id existimari] id existimare (16. 3); parthico] particho (17. 1); but H reads particho in § 6.

III. comodo] quomodo (5. 4); praeesset] praesset (5. 5); mensium] mensuum (6. 5); quae me] quae de me (6. 5); me ex cilicia recepissem] me exciliare coepissem (7. 2); etsi] utsi (8. 1); isdem] hisdem (8. 6); repressi] repraes (8. 7); is] his (8. 7); Appio] apud (9. 1); victor ea] victor . . . et ex (10. 1); marco] margo (10. 5); nobilissimi] nobilissime M¹ (10. 9); obscurum nuntiari] obscura nuntiari (11. 1); per te] perite (11. 4).

IV. ea quae] eaque (2. 3); omniaque quae a] omnia quaeque a (3. 3); isdem] hisdem (3. 4) (4. 1); es] est (4. 1); is] his (4. 2) (4. 4); rem a parente] rem apparente (5. 3); deesse] desse (5. 6); a me] me (6. 3); effectum, *not repeated* (11. 1); ut aiebat] utiebat (12. 1); id ipsum video] de ipsum video (13. 2); polliceri possum] polliceri possim (13. 3); quae ab] qui ab M¹ (13. 4); si scissem] siiscissem (15. 1); oportere] oporteret M¹.

V. scio] *om.* M (2. 7); utendum] ut est dum (2. 10); litterae Q. fratris] litteraeq. fratris (4. 1); mihi Quintus frater] mihique frater (4. 2); conciliatura] conciliatur (7. 2); ea quae] eaque (7. 3); prosternat] prosternast (9. 1); me totum] meme totum (9. 1); grata] ut grata (11. 1); deesse]

desse (12. 2); ad nostram] ut nostram (12. 2); annalium] analium (12. 5); hector] haector (12. 7); reperies] repperies (13. 3); defatigato] defetigato (14. 1); quae non] quaec non (16. 5); duxi] dixi (17. 3); grauius tuli iamdiu] grauius tuli iamdiu tuli (18. 1); nati] notati (18. 1); si ad me misisses] si admeminisses (20. 1); auctore] actore (20. 5).

VI. adiuuisti] adiuisti (2. 2); adiuuat] adiuat M¹ (4. 4); celeri] ceteri (6. 2); alteram H²] alterum MH¹ (6. 8); iuuandi] iuandi (10. 5); nos] uos (18. 2).

VII. troiano H¹ M²] traiano H² M¹ (1. 2); magnificae] magnifice (1. 3); exspecto] exispecto M¹ (1. 4); praetermisisse] praetermissee (1. 6); deessem] dessem (3. 1); quam si] qam si (3. 5); querar] quaerar (8. 2); deesse] desse (9. 2); deest] dest (9. 2); sapere] aspere (10. 1); hibernaturus] hiberaturus (17. 3); migrare] magrare (23. 4); sextio] sentio (24. 2); domo H M¹] domi M²; audi] audii (25. 2); apellae] appellae (25. 2); testis quid mihi] testis mihi (27. 2); meis] miis (28. 2); sine] si (29. 2); animo] animus M¹ (31. 1); meorum ut] meorum ita ut (32. 1); ingemiscamus] ingemescamus.

VIII. Index of first nine letters in H. No index in M; causa] causam M¹ (4. 2); sextiles usque] sextus que (4. 3); ut] et (5. 1); si] sic (5. 3); simultas tibi] simulatast ibi (6. 1) stultissimasque] stultissimas qui (8. 2); consularibus] consulatibus (8. 5); quid] quis (8. 5); referretur] referrentur (8. 5); oporteret] oportere (8. 8); effecit] efficit (8. 9); eas quae] eas que (8. 10); ad sitianam] at sittianam (9. 3). Between Epistles 8 and 9 in M comes in Ep. 1, book II. It does not appear in this place in H.

The identity of the Harleian *ms.* with that which Graevius calls his 'primus' or 'optimus,' and which is, as he says, 'his cynosure' is well nigh certain; and the objective proof Streicher has adduced in his *Addenda* adds whatever may be necessary for establishing the point. The actual instances of agreement, however, that Streicher has brought

forward are not as convincing as are to be found. Stronger than most of his are the following :—favisti, *omitted* (I. 7. 8); Ego sedente G. N. Pompeio laudaret P. Sestium introiss. (I. 9. 7); recipere licuisset (I. 9. 16); Consuli caelio lucio figulo G. N. Caldo quinto (II. 19. title); iuget *for* iuuet (III. 1. 1); discessisset, *in margin* decessisset (III. 10. 3); industres (III. 10. 4); epictote (III. 10. 6); omnes tuae et industriae meae fructus (IV. 6. 2); discessio, *emended to* decessio (IV. 10. 1); nihil eis, *omitting* ominus (IV. 13. 2); ueue-rebare (v. 7. 3); sicut indicas (v. 14. 1); probatio (*sic*) (v. 16. 3); Publio Sestio Publio furio (v. 17. title); refrigerem (v. 17. 4); quod ego de legato parum grauissime (v. 20. 6); in pecuniae exactu (v. 20. 6); marina (*sic*) (v. 20. 8); in urbe subitata et alte stratio (VI. 1. 6); et in siglia (VI. 8. 1); cum studium tuum cum summa uirorum fortium memoriae factis propendis (VI. 12. 4); illas XI. esse legiones (VI. 18. 2); spē adture, quando (VI. 19. 2); ciuitatissimis (VII. 6. 1); quid agas hec quid sit (VII. 11. 2); aut i me (*for* audi Testa mi) (VII. 13. 1); a. d. tercias Nonas Mar. Chrysippus Vettius (joining end of VII. 13 to beginning of 14); unum quem, *for* nonnunquam (VII. 19. 2); ne iconoen EPITIO dy quae asiae (*for* Νικωνος περι πολυφαγίας (VII. 20. 3); de tigollio (VII. 24. 1); fungos uel uiles herbas (VII. 26. 2); ut mihi ueantur (VIII. 4. 5); incilicia omnia (VIII. 5. 3); solum solent (*with* solum *underlined*) (VIII. 8. 3).

The passages, on the other hand, in which the reading given by Graevius as that of his 'primus' differs from that of H are singularly few, when we consider the enormous number of references he makes to his favourite MS. They are in all ninety-six, of which I add a few samples to show how trivial they are:—

GRAEV. PRIM.	H.
I. 2. 4. agantur.	agatur.
9. 14. excitati.	exercitati.
II. 6. 1. servum Iulium.	sexium ilum.
8. 1. Chresti.	heresti.
10. 1. ne nihilo.	de nihilo.
10. 4. ex tuis ut antea.	ex tuis litteris antea.
III. 4. 1. C. filius.	gneus felix.
7. 4. alteraque Lepta.	alteramque Leptam.
8. 1. adhortatione.	hortacione.
IV. 5. 3. liberos tute commit- tere putares ut antea filios liberos.	liberos tuos te tuto commit- tere putares ut antea liberos filios.
V. 12. 6. quicquid nescias.	quicquid sis nescias.
17. 5. consolandum.	consolandam.
VI. 4. 1. uideamur.	uidemur.
14. 1. eo me carere confi- teor.	eo carere me confiteor.
20. 2. multo.	multos.
VII. 1. 5. lecticula.	lectula.
17. 1. quam subimpudens.	et subinpudens.
17. 2. nactus si me.	nactissime.
24. 2. si sumpsisset.	cisisumpsisset.
VIII. 3. 3. nosti.	nostri.
5. 3. superent.	superet.
6. 1. cum quo si simulas non fuisset.	cum quo simulas tibi non fuisset.

These and all the others I have observed are very slight, due, no doubt, either to the discrepancies not being the words Graevius wished to emphasize in his quotations, or to his quoting from memory, or to a certain carelessness. For, as Streicher has remarked (p. 131), Graevius in his notes under the text does not always agree with Graevius in his *Variae Lectiones*, e. g. et os qui te et maxime debuerunt et plurimum iuvare (Graev. sub textu H); eos maxime

qui et te amare maxime debuerunt et plurimum iuuare (Graev. *Var. Lect.*) (I. 7. 2); stultitiam fama mulcet (sub text. H); stultitiam multet (*Var. Lect.*) (VI. 7. 1).

It seems to me quite certain that Graevius's 'primus' was H; and as to its importance, one may well endorse the judgment of Graevius himself when he laments over his MS. breaking off at VIII. 9. 3. 'In sequentibus verbis *puto etiam si ullam spem* desinit meus ille praestantissimus et fidissimus codex, qui bonitate nulli eorum cedit quos docti uiri excusserunt, immo omnibus, excepto Mediceo, melior est.' Rühl and Streicher tell us it came from the hospital of St. Nicholas of Kues (what is the evidence?). Graevius bought it, he tells us (*Praef.* p. 3), with his own money in a bookshop in Cologne. It came into Harley's possession at the same time as the well-known MS. of Horace (Harl. 2725) that had belonged to Graevius.

The collation of the MS. suggested a great number of remarks to be made on the received text. Omitting nearly all that occurred to Streicher also, and are noticed by him in the highly ingenious and profound latter half of his paper, I proceed to offer a few considerations on some of the doubtful passages in the first eight books.

I. I. 1. qui tu M T; quod tu H]. Baiter reads *quia*: most edd. *quoniam*. Graevius errs, I suspect, in saying that his MS. reads *quia*. *Quod*. = 'because,' 'since,' will suit very well.

I. I. 4. quod M; quo H T]. The latter is the lectio difficilior. There is no need to add '*plus*,' with Streicher: cf. Att. III. 15. 4. Neque haec eo scribo quo te non meo casu maximo dolore esse affectum sciam, &c. Similarly in I. 7. 8, where it is usually read *Quod* eo liberius ad te

scribo quia non solum temporibus his, &c., M reads *qui* non solum; H *quo* non solum—the latter rightly.

I. 1. 4.. *fin.* Amorem tui absentis praesentes tui cognoscent M; amorem tui absentis praesentisue cognoscent H T]. Graevius says *absentis praesentisue* are nominatives plural; I cannot think rightly. But still I should keep the reading of H T. Why not take the words as genitive singular? 'We are in the same state,' says Cic., 'as we were before you started. I am as loyal and devoted to you now as then—to you when away as when here; and this fact all will recognize.' The preceding *tui* led to the error of M.

I. 4. 2. Sceleratissimo tiranno latrocinio (with *tiranno* underlined, signifying that it is to be omitted) H]. But how did it suggest itself to the copyist to insert it in the first instance? I think it was in the archetype. When we consider that *trib. pl.*, as a general rule in these letters, appears in all the MSS. as *tirannus puplius lentulus*, it is possible that *tiranno* here has taken the place of *tri.* (= *tribunorum*): cf. Q. Fr. II. 2. 5 (written just about this time). Quid futurum sit *latrocinio tribunorum* non diuino. We want an antithesis to *populi* badly.

I. 5a. 2. Nihil magis de causa quam perfidiam timemus H]. The other MSS. omit *de causa*. It is not wanted. Possibly its addition is due to *de causa*, a little above, or to the very similar *re causa*, just a line below. I feel, indeed, that this kind of dittographia, whereby a combination of letters tends to get added not immediately after, but with intervening letters or words, and sometimes to creep in even *before* the word that is the cause of the error, cannot have been of very frequent occurrence; and I cannot but think Streicher pushes it too far: *e.g.* p. 110, in IV. 12. 4, *nostri et uarietatem*, he attributes the superfluous *et* to the same letters in *uarietatem*; p. 180, V. 2. 7, he considers the *animo* of M H to have arisen from the

nearly similar combination of letters in *iniurianemounquam*. Compare also his remarks on this class of errors in the Paris MS. (p. 108)

It does not seem to me improbable that the lines of the original MS. from which H was copied were about the length of from *magis de causa* to *re causa*; and the latter occurring just below *magis* caught the copyist's eye. This will account for such an omission in H as at I. 9. 13, *potuisset . . . sed*, the copyist having omitted a line; and II. 3. 1, *facultate*, which appears in H erroneously for *satiē-tate*, arose from its having been just above it in the original.

I. 5a. 4. *gravitate se positam* H T]. The *se* points to *esse* as the reading.

I. 5b. 1. *detraxit* M; *detraxerit* H]. The latter is the *lectio difficilior*—'the senate will be found to have taken nothing from you'; though perhaps it may be due to the recollection of the word in the preceding letter.

I. 9. 4. *non aliquo* (so all MSS. *alicui*, Orelli, Baiter) *erga me singulari beneficio debitum praestitissēm*]. Klotz, in his second edition is no doubt right in adhering to the MS. reading, and taking *merito*, *officio*, *beneficio*, as ablatives of cause. Graevius naturally read *aliquo*.

I. 9. 7. *exire de domo* H]. Though Cicero is very partial to the use of *de* after *exire*, yet I cannot find any example of his using a preposition with *domo*: see Verr. II. 89; Caec. 34. He, however, always uses a preposition after *abesse*—even with *domo*—except with the names of towns, though all the MSS., it is true, omit the preposition in IV. 6. 2, V. 15. 4. See Mr. Reid's *Academica*, I. 1.

I. 9. 12. *in hac mente* H M¹; *in hanc mentem* M² edd.] Streicher (p. 185) justly defends H M¹. This use of *in* is quite common—'when I was in this state of mind': cf. Fam. III. 11. 4, Cluent. 25. The proximity of *impulit* caused the alteration. The ablative is certainly the *lectio difficilior*.

I. 9. 16. H also has the words *est uero probandum*.

I. 9. 17. H also reads *sed etiam sensu saepe*, &c., not *sententia*, which was a conjecture of Manutius. Klötz (ed. 2) rightly defends the MS. reading. *Sensus* would be subjective; *sententia* objective. *Sensus* (plu.) *in republica* is, as Mr. Reid says (Sulla, 64), the proper expression for 'political sympathy': cf. Fam. XII. 15. 2. We may add Marcell. 16; Phil. x. 4; Att. xv. 7.

I. 9. 18. *cumque eum nec persuadendo nec cogendo regi posse uidisset*]. So all the MSS. Streicher's remedy (p. 192) for the defective logic of this well-known passage is very desperate. He considers these words to be most certainly spurious, and ejects them. A simpler remedy would be to read *nec nisi cogendo*. I cannot, indeed, find in Cicero any example of *nec nisi* without intervening words; but we have *non nisi*, *nemo nisi*, *nihil nisi*. Palaeographically *n̄* (= nec) and *n̄* (= nisi) differ very little. See Chassant (Dict. p. 58).

I. 9. 18. *quascunque res gereret M; quascunque res in ira T; quascunque res mired H*]. The latter leads to our correcting to *iniret*. Though I have been unable to find an example of *inire rem*, still the analogy of *inire consilium*, *inire rationem*, *ingredi in res* (Div. in Caec. 40), leads one to consider that *inire rem* is a legitimate expression.

II. 1. 2. *consequi ni meis*, &c., H]. T has a *u* with a *t* above it; that does not differ much from *n̄* (= *nisi*). Baiter printed *ni* by conjecture.

II. 5. 2. *sed haec ipsa nescio rectene non sint litteris commissa H M¹; rectene (omitting non) M²*]. The former seems right. *-ne* answers to *an* in the more usual construction, and *nescio an non sint* = 'I am inclined to think they are not right,' &c.

II. 7. 2. *cur ego absum uel spectator audum ltuarum* (all MSS.); *cur ego non adsum* (all edd.). Perhaps there is an omission, *cur ego absum et non potius adsum*.

II. 9. 2. *laetitiis* M; *laetus* H (where this epistle occurs after VIII. 5)]. A combination of the two, with a comparison of Fin. II. 13, will justify Martyni-Laguna's correction, *laetitiis laetus*.

II. 10. 1. *Equidem nunquam* (M T; *nullam* H) *domum nisi unam epistolam quin esset ad te altera*]. The reading of H might stand; for *nullus unus*, cf. Brut. 216, Prov. Cons. 7.

II. 15. 4. *adolescentem non tam allicere uolui quam alienare non potui* H; *alienare nolui* M]. The reading of H is more likely to have been changed to *nolui* than *vice versa*.

II. 16. 2. *qui conuenit* M; *quod conuenit* H]. M is no doubt right. In III. 11. 2, M and H read *quod* for *qui*.

II. 16. 3. *existimare* M T; *existimari* H]. The latter is read by all editors.

II. 16. 5. *relinquā in memoriā* H]. This makes for Cratander's correction, *relinquam memoriā*.

II. 17. 3. *item* M; *idem* H]. Either would suit the passage. Another instance of variance of the MSS. in these words occurs at V. 2. 7.

II. 17. 7. *uti negarem* M; *uti me negarem* (Lambinus, Baiter); *uti megarem* H], which latter makes for Lambinus' correction.

II. 19. 2. *Quamobrem quaecunque a me ornamenta in te proficiscentur ut omnes intellegant* M]. Victorius wishes to take *quaecunque* in the sense of 'all'; but Cicero and the best writers always use the word in a strictly relative sense with its own verb, except in the abl. sing., in such phrases as *quacunque ratione*, *de quacunque causa*. See Madvig, Lat. Gram. § 87, Obs. 1. He uses, however, *qualiscunque* quite indefinitely without a verb, Fam. IV. 8. 2. The simplest way to account for the corruption in this passage is to suppose an omission caused *ex homoeoteleuto*, and read *Quamobrem quaecunque a me ornamenta in (ad*

H) te *proficiscentur ita* proficiscentur ut omnes intellegant, &c. For this use of *proficisci* cf. Fam. III. 1. 1, also Cluent. 124, a Cluentio profectae pecuniae uestigium ostende.

III. 6. 5. quae mihi longa uidetur M; uideretur H]. The latter is a correction of Cratander; Graevius strongly approves of it. It is adopted by Baiter.

III. 6. 6. quo loco M; quo in loco H]. Yet H reads *quo loco* at the end of the letter.

III. 8. 1. ad urbem esses M; isses H]. M is the lectio difficilior, and no doubt right. *Ad urbem esse* was used, as Manutius tells us, of generals waiting outside the walls for a triumph.

III. 8. 2. uoltu taciturnitate M; uoltu et taciturnitate H]. Lambinus had already added the conjunction, and is followed by Baiter. Still asyndeta of this sort are very common in Cicero's letters.

III. 8. 2. As M, so too H has sollicitudine significatione.

III. 8. 6. cum *meam* Laodiceam uenire uoluisses M; *me*, Orelli, Baiter; *me iam* H]. The latter has already been conjectured by Klotz.

III. 9. 4. cures enitare M, Klotz; cures *et* enitare, Baiter; cures. Enitere H]. This latter reading makes capital sense, and may well be right.

III. 11. 2. Nec tam gloriosum exitum tui iudicii existisse, sed tam prauam inimicorum tuorum mentem fuisse mirabar. De ambitu vero quid interest, inquires, an de maiestate? ad rem nihil; alterum enim non attigisti, alteram auxisti; uerumtamen est maiestas, etsi Sulla uoluit, ne in quemuis impune declamari liceret; ambitus uero ita apertam uim habet, ut aut accusetur improbe aut defendatur. Qui enim facta aut non facta largitio ignorari potest? Tuorum autem honorum cursus cui suspectus umquam fuit.

The difficulty of this passage is notorious. I have given

the reading of M. Rein (Das Criminalrecht der Römer), in the sub-section of his chapter on *Maiestas* which treats of the *Lex Cornelia* (pp. 510-514), says that by this law what was *maiestas imminuta* was not clearly defined, as Sulla put into this category many actions which according to earlier legislation did not fall under it, and, moreover, he described these in vague and general terms, *e.g.* it was *maiestas* if a magistrate did not maintain the dignity of his office (Verr. I. 33). Rein explains our passage: 'However, treason is a far more extensive field of accusation, although Sulla by his law in no way wished to favour false accusers'; and as an example of the wide range of actions that might be characterized as *maiestas*, he quotes Verr. IV. 88, where Cicero declares Verres to be guilty of *maiestas* for stealing the statue of Mercury which Scipio had set up at Tyndaris in Sicily. [I should not lay much stress on this: it is a very rhetorical passage.]

At any rate Rein's interpretation makes good sense; but can the words bear that sense? Where is the idea of 'all-comprising' to be got? *Maiestas* is vague, but *ambitus* is definite. But where is 'vague'? This interpretation, I fear, will not hold. We must try for some other one.

And first let us see what is the drift of the whole passage. As I understand it, it is this:—Cicero is congratulating Appius on his acquittal for *maiestas*, which he says he does not wonder at in the least; the only wonder is that his accusers were so foolish as to accuse him of *maiestas* and not of *ambitus*. Why, what difference does it make? Appius is supposed to ask. None, as a matter of fact, to you, Cicero replies, for you are innocent of both charges; but in a prosecution for such a serious crime as *maiestas*, a certain dignity and absence of violent, reckless accusation must be observed; while in a charge for bribery, the facts being always patent, there is room for unlimited

impudence in either accusation or defence, according as the defendant is innocent or guilty. But of course there is not a shadow of suspicion attaching to the way you got your different political distinctions.

It is difficult to understand why Sulla is referred to. The *Lex Cornelia de Maiestate* was of course a law of Sulla's, but it forbade 'exire de prouincia, educere exercitum, bellum sua sponte gerere, in regnum iniussu populi aut senatus accedere (Cic. Pis. 50). He also was guilty of *maiestas*, qui exercitum hostibus populi Romani tradidit (*De Orat.* II. 164). Bulbus (Cluent. 97) is accused of *maiestas* because legionem esse ab eo sollicitatam in Illyrico planum factum est. In fact, 'in the Republican period,' as Mr. Long says in *Dict. Antiq.* (724 *b*), 'the term *maiestas laesa*, or *minuta*, was most commonly applied to cases of a general betraying or surrendering his army to the enemy, exciting sedition, and generally by his bad conduct in administration impairing the *Maiestas* of the State.' So there appears to be no evidence that Sulla in his law of treason specially forbade reckless accusation; nor should we follow Gronovius in inventing an *ad hoc* clause in the *Lex Cornelia*, viz. ne in quemvis impune declamari liceret—a theory to be considered not proven, both from lack of evidence on the point and from the passage of Tacitus, *An.* I. 72, which Schütz urges against it (*facta arguebantur, dicta impune erant*).

The Harleian MS. (= Graevius' primus) here reads 'Verumtamen est maiestas et sic si illa proprium nomen fuit illa uoluit ne in quemuis impune declamari liceret.' Two other MSS., viz. Dresd. IV., v., Schütz tells us, have *etsi ulla uoluit*. Graevius mentions some MSS. as reading *et sic ulla uoluit*. Another Harleian MS. (No. 2591) has *Silla*, but the two first letters are distinctly written over an erasure. So that the word was not in all the MSS.

Graevius quotes this passage as an example of porten-

tous corruption in his optimus et vetustissimus codex. I am not so sure of that. There is an obvious gloss, but not much further error; and the gloss is very helpful. For I think that *illa* is a proper name, and is *Maiestas* herself, the goddess, and that the sentence should run something like this: 'Verumtamen ea (or 'tanta') est maiestas et sic illa uoluit, ne in quemuis impune declamari liceret'; 'but *maiestas* is of such a grave nature, and so she willed, that reckless accusation against any one at all should not be allowed.' Baiter has inserted *ea*. The *si* before *illa* arose from dittographia. The imperf. conjunctive is due to the attractive force of the intervening perfect.

In early times, shortly after the formation of something out of chaos, Ovid (*Fast.* 5. 15, *sqq.*) tells us, there was considerable disorder: no one had or knew his place. The stars used not to yield precedence to Phoebus; Saturn was often driven off his throne by the lowest plebeian gods—

Donec Honor placidoque decens Reverentia uoltu
Corpora legitimis imposuere toris.

Hinc sata Maiestas; hos est dea censa parentes:
Quaque die partu est edita, magna fuit.

Nec mora: consedit medio sublimis Olympo,
Aurea, purpureo conspicienda sinu.

Consedere simul Pudor et Metus. Omne uideres
Numen ad hanc cultus composuisse suos.

Protinus intrauit mentes suspectus honorum:
Fit pretium dignis; nec sibi quisque placet.

In fact *Maiestas* did not allow that brawling and indiscriminate accusation, especially against 'the best and stateliest of the land,' which is characteristic of demagogues from the days of Thersites.

Ambitus is quite different. In it, a trial for bribery, if the defendant is innocent (as in the case of Appius), his innocence is patent; and the accusers can only hope to win

their case by audacity and impudence, and by brow-beating and bullying their opponents. Such is the meaning of *improbus*. See Professor Mayor's learned note on Juvenal, IV. 106, and follow his references. Appius's accusers were most wrong-headed not to have accused him of bribery. There they would have had plenty of scope for the exercise of their unblushing impudence.

To play on the names of these abstract gods and goddesses was a common-place of Roman pleasantry. It is met often in Plautus, *e. g.* Most. 2. 1. 4 (Salus); Cist. 1. 2. 8 (Liber); Pseud. 2. 3. 3 (Opportunitas); Asinar. 2. 2. 4 (Lubentia). Also in Cicero, Font. 21 (Salus). A great number of such abstract deities are mentioned in N. D. II. 61.

III. 11. 2. Quod enim facta *et non* facta largitio ignorari potest M, Baiter, Klotz; *aut non* Graev., Ern.; *nec non* Amsterdam MS.; *nec me* H]. This latter would seem to confirm the reading of Rob. Stephens (apud Graevium, Var. Lect.), *nec ne*.

III. 11. 5. Dicit Tullius M; D. Tullius H]. This had been already conjectured by Orelli, and is read by Baiter and Klotz. There is a very similar corruption in M, at III. 6. 5, where it reads *dedit Antonium* (H omits *dedit*). Baiter conjectures *D. Antonium*.

III. 12. 2. Omnino M, omnimodis H]. The latter is, no doubt, the lectio difficilior. Schütz reads it in the text from Gronovius's MSS. It is a common Lucretian word (see Munro on I. 683); but is it Ciceronian? Madvig rejects *multimodis* at Fin. II. 82.

III. 13. 1. Onus officii M, Orelli, Baiter; *munus* officii H, Ern., Klotz]. The former is the more usual expression in Cicero: cf. Div. in Caec. 5. Sex. Rosc. 10, 112. Sulla 65, where see Mr. Reid's note.

IV. 2. 1. Ipse ad me non uenisset litteras tuas misisset M; ipse ad me non uenit set litteras tuas misit H]. The reading

of H will not hold: we must have the subjunctive here, as a reason is assigned for the thoughtlessness of Philotimus; but it is easy with Orelli and Baiter to supply *sed* (*set*), which has fallen out in M, after the same letters in *uenisset*.

IV. 3. 1. *sed aliquid M, ipsi aliquid H*]. It is difficult to see how two such different readings arose. I prefer that of H. The use of *sed*, = 'aye and,' though found in Plaut. (Rud. 3. 5. 20) and Cicero (Orat. 97), (as we learn from Prof. Mayor, on Juv. 5. 147), still is mostly used in post-Ciceronian writers. Further, *ipsi* emphasizes the *additional* licence they *themselves* think it allowable to take.

IV. 4. 3. *neominus M¹, ne ominis M², ne hominis H*]. This latter had been already adopted by Graevius, Orelli, Baiter, Klotz. It is found in a great number of other MSS. See Graevius on this passage.

IV. 4. 5. *sed consulimus tibi M, sed magis consulimus H*]. The latter is probably right, the corruption in M being *ex homœoteleuto*. For *cupimus* immediately preceding we should expect *cupiamus*; but the MSS. are inexorable.

IV. 6. 1. *cuius officia iocundiora scilicet saepe mihi fuerint M, fuerunt H*]. Oddly enough Graevius declares for *fuerint*, and considers *scilicet* (written *s.*) to be an insertion of the copyist. But its usage, as here with *sed*, is most common; see Lewis and Short, *s. v.* The reading of H is right; and had been already corrected by Cratander, and is read by Klotz and Baiter.

IV. 7. 3. *hique M, hii qui H*]. Probably *ut ii qui* is the right reading, as Klotz has conjectured.

IV. 7. 3. *aut quemadmodum nos victores esse crediderunt M; victori sese Baiter, Klotz, after Victorius; victos se esse H T*]. The latter is probably the true reading.

IV. 8. 2. *reque principem M, reique p. principem H T*]. Though Cicero often personifies the State, still the conjunction of *homines* and *respublica* is too harsh, and the pro-

bability of corruption, owing to the proximity of *respublica*, too great to allow us to adopt the reading of H and T.

IV. 9. 2. coniunctum esse periculum MT, esset H]. The latter is right, and had been so corrected by Cratander, and is read by Klotz and Baiter.

IV. 9. 4. esse MHT, Klotz, Baiter; Orelli's conjecture, *isse*, is quite needless.

IV. 9. 4. aut cer proximis sim M; aut certe proximus sim H T, Orelli, Klotz, Baiter.

IV. 12. 3. in nobilissimo *orbi* terrarum gymnasio M, Baiter; *orbis* H]. Either would do; M is the lectio difficilior. For this use of the ablative without *in*, cf. Verr. IV. 82, de Domo 24, Sest. 66. The abl. appears to end in *-i* when thus used without an adjective. It is, in fact, a locative. When used with an adjective it is *orbe*: cf. Flacc. 63.

IV. 13. 1. ne quid tale scribere possem M; ne quid *tibi* tale s. p. H T]. The latter, perhaps rightly, as *tibi* is more likely to have been omitted than added; and it need not be emphasized. Thurot (p. 12) declares for M.

IV. 13. 6. ac de re M; ea de re HT; hac de re (all edd.)

IV. 13. 7. Extremum illud est ut te ortem M; hortem (other MSS.); orem H]; the latter rightly, confirming a correction of Victorius.

V. 1. 1. nec absente ludibrio MT; nec absentem ludibrio H, Klotz]. Most edd. read nec absentem *me* ludibrio. Certainly the sentence was better with *me* added; but as the letter is not a model of very excellent literary style, we may adhere to H.

V. 2. 7. Scio]. Omitted by M; found in H T, rightly.

V. 2. 7. Atque ille . . . qua iniuria nemo unquam in animo (aïmo) magistratu improbissimus cuius affectus est ea me consulem effecit]. So MH; however T and the Paris MS. read *aliquo*. The contractions used to express these two words, *animo* and *aliquo*, are remarkably similar. See Chassant (Dict. p. 4). In many words the first and last

letters only are expressed: see Wattenbach (Anl. zur lat. Pal. p. 70). But, as Streicher justly remarks, an opposition is wanted to *consulem* which *aliquo* does not supply. I think it probable that *alio quo* was the original reading.

V. 2. 9. *senati* M; *senatus* HT]. At II. 7. 4 the same variants occur, though there M² reads *senatus*. The MSS. of Cicero seem to decide for *senatus*. Merguet quotes only two examples of the other form (Div. in Caec. 19, Phil. VI. 9). But it is not necessarily wrong: cf. Quintil. I. 6. 27. *Quid de aliis dicam cum senatus senati an senatus faciat incertum est.*

V. 8. 4. *quos quidem ego ambo unice diligo sed in Marco benevolentiam pari hoc magis sum Publio deditus, quod, &c.*] So the MSS. Already Graevius had read *benevolentia impari*: Orelli, Klotz, and Baiter read *in Marcum benevolentia pari*, 'though feeling equal good will towards Marcus, yet,' &c. The words seem to me to give the reason why Cic. did not like Marcus as well as Publius, and that we should read 'in Marco benevolentia *impar et hoc*,' &c., 'but Marcus has not as much kindness and good will as his brother, and accordingly I am more devoted to Publius because,' &c. 'Benevolentia' is that feeling that takes kindly interest in other people. In Marcus it was defective; not as great as in Publius. The *i* in *pari* arose possibly from the Tironian note for *et*. See Wattenbach, p. 62.

V. 12. 3. *suauiissime* M T; *plenissime* H]. Probably both should be read, as it is hard otherwise to account for the variants. If only one be retained, that of M T seems most in accordance with the complimentary tone of the context.

V. 15. 2. *obduerunt* M; *obduruerunt* T; *obdurarunt* H]. No doubt T is right. The corruption in M is due to the copyist having gone on at the wrong *u*; that of H possibly to *obdurare* being a common ecclesiastical word for hardening the heart, and besides monks and such *obscuri uiri*

were very partial to conjugating all verbs in the first conjugation. Cicero in a difficult letter (Att. XII. 3. 1) uses the word for 'to hold out doggedly', but that can hardly be the sense here.

V. 15. 2. studia paria quod uinclum *quas id est* nostrae coniunctionis M; quod uinclum *quasi est* n. c. HT]. The usual reading is *quasi deest*. However there does not seem much objection to adopting the reading of H T except the position of *quasi*. Though Cael. 75, in hoc flexu quasi aetatis, may be compared, still I should be inclined to transpose the words *uinclum* and *quasi*.

V. 16. 6. officio tamen esse functurum beneuolentissimi M; funtum (*marg. functurum*) H]. *Functum* seems the right reading owing to *assecutum* previously. Wesenberg had already conjectured *functum uiri*, which is read by Klotz and Baiter.

V. 18. 1. notati M; nati HT, Orelli]. This latter is probably the right, and there is no necessity to adopt *nos nati* with Rost (followed by Klotz and Baiter).

V. 19. 1. et his M; ex his HT]. If we combine both readings, as Thurot suggests (p. 16), we arrive at *et ex his*, the correction of Martyni-Laguna, which is read by Baiter.

V. 20. 1. si admeminisses M T; si ad me misisses H]. The latter rightly, as is read by Klotz and Baiter.

V. 20. 2. darem M; dedi H T]. Thurot (p. 16) has already suggested that Wesenberg's reading *cui dederam* should be changed to *cui dedi*.

V. 20. 6. Sed si quid est quoniam de logaeo parum grauisum (gauisum T) est M; sed quid est quod de legato parum grauissime H]. Streicher (p. 203) reads *sed si quid est de Luceio paulo grauisus uisum est*. However, if we take H to guide us, we arrive at a less violent remedy by reading *sed si quid est quod de legato parum graue uisum est*. The *si* fell out after *sed*, which was written 1. We find *si* for *sed* in H and T at I. 8. 3: sed nec (si nec H, sine T) mihi

magis quam omnibus. I think that the generally read *st* in Att. II. 1. 10; XIII. 3. 1; Fam. XVI. 24. 2, occurring as it does in M, always as *si* and after *sed*, arose from dittographia. In the larger Harleian MS. (N^o. 2682), which contains the last eight books of the Epistol. ad Fam., we find at XVI. 24. 2, only *l*, tuas litteras exspecto. *St* is altogether too conversational even for the letters. I should mention, however, that Ursinus declares that a 'vetus liber' has *st* in this latter passage.

V. 21. 5. H reads *inhonorabile* as well as T, so that we may now consider the reading *horribile* to be exploded. See Thurot, p. 16; Streicher, p. 173, who, however, is in error in stating that H reads *honorabile*, for it has *ī honorabile* quite plainly.

VI. 3. 4. aut eorum qui discesserint aut eorum qui remanserint]. These last four words are an old supplement; they are not in any MSS. T and P read *auctorum*, and Streicher (p. 205) thinks this shows the way to the true reading, *uictorum* for *aut eorum*. He sees clearly the ambiguity of the word, but considers the subsequent clause obviates that difficulty. However, *discedere*, in the sense here required, generally has a predicate; and the ambiguity of *uictorum* would be considerably lessened by reading *uictorum qui uiui discesserint*.

VI. 6. 3. Si te ratio quaedam iratuscae disciplinae . . . non fefellit, ne nos quidem nostra diuinatio fallat, M; quaedam tusce H; quaedam mira tuscae T]. The latter confirms Baiter's correction. The error in H is due probably to the copyist, when he got to *quaedā*, having gone on at the wrong *a*.

VI. 7. 1. Filius, ut audio, pertimuit neque iniuria, si liber exisset . . . ne ea res inepte mihi noceret]. So the MSS.; but Wesenberg (Em. alt. p. 14) justly objects to *inepte nocere*, though he is not happy in suggesting *impense* or in omitting the word supposing it to have arisen (how?) from.

neeares. In the well-known definition of the *ineptus* (Cic. De orat. II. 17) the man who does ill-timed actions, *qui aut tempus quid postulet non uidet*, is the first to come under that category. I think we should read *ne ea res, ut inepta, or si inepta*.

VI. 12. 3. *quam illi appellant tubam belli* M T; *quem* H]. The latter is of course right, and confirms a correction of Cratander.

VI. 13. 5. *ut non modo cum (non H) secunda sperare debeas* M T]. The reading of H makes for Lambinus' correction to *nunc*. The two words are very like one another when abbreviated. It must, indeed, be confessed difficult to see how the variants have arisen. Streicher (p. 156), who wishes to eject the word, supposes *cum* to have arisen by dittographia from the *cu* in *secunda*; but what about *non*?

VII. 16. 3. *postea uideo. Qui* M; *postea uidebunt ui* T; *postea uidebo quid* H]. Orelli and Baiter read *uidero. Qui*; Klotz *uidebo. Qui*. The tradition of T and H points to this latter as being correct.

VII. 24. 1. *amoris quidem tui, quoquo me uerti, uestigia uel proxime de Tigellio*]. So all MSS. Perhaps we should supply *animaduerti* after *uerti*; though indeed all the letters of this period are full of strong ellipses, *e. g.* Att. XIII. 51. 3. For *uel* = 'for instance': *cf.* II. 13 init.

VII. 24. 2. *Respondi nullo modo me facere posse* M; *Respondi id nullo modo, &c.,* H T]. The sentence runs more smoothly with *id*, and *id* is less likely to have been added than omitted.

VII. 25. 1. *Quod autem me mones ualde gratum est, idque ut semper facias rogo. Videris enim mihi vereri nisi* (M; *ne si* H T) *istum habuerimus rideamus* γέλῳρα σαρδάμιον]. There must be some predicate supplied after *istum*; and adopting *ne si*, the reading of H T, we find Baiter reading *infestum* (but, as Wesenberg says, *aliquem infestum habere* would mean 'to molest a person'; but can you

use it of a person at all? You can of course say *mare* or *agrum infestum habere* = *infestare*). Wesenberg himself proposes either *iratum* or *inimicum* or *ne nisi placatum*. Streicher suggests *ludibrio*. Certainty will be difficult to obtain in a case like this; but perhaps *Sardum* would have more point than any of the other conjectures proposed. 'If we say he is a Sardinian we shall laugh a *σαρδάνιον* laugh,' with a double meaning, at a Sardinian, and at the wrong side of our mouths (for Tigellius had influence with Caesar). A Völksetymologie always connected *σαρδάνιος γέλως* with Sardinia. In the previous letter Cicero had joked a good deal about the native country of the 'Sardus Tigellius' (he seems to be always so called), who was more pestilent than his native land—who, with his precious uncle Phamea, were *Sardi uenales*.

VII. 32. 2. *urbanitatis possessionem amabo quibusuis interdictis defendamus; in qua te unum metuo, contemno ceteros*]. So the MSS. Streicher (p. 210) wishes to read *curabo* for *amabo*, on the grounds that the succeeding clauses show that Volumnius was in no danger of losing the possession of *urbanitas*, and that it is absurd for one rival to ask another to strive to get possession guaranteed to them *both*. But what Cicero means to say is this: 'I pry'thee let's get exclusive possession of smartness guaranteed to us both. We two alone really rightly possess it. All the rest are impostors; but they will try to lay claim to it if we do not be careful and get the law on our side. We two alone are smart, and you are my only rival.' The whole passage is eminently *urbanum*. *Urbanitas* is smartness and brilliancy, especially in conversation. (See the definition of *Urbanitas* in Quintil. VI. 3. 104. From § 102 to the end of the chapter is well worth reading). The passage before us has a conversational tone, and *amabo* belongs to the language of conversation. It is in a manner *ineptum* to subject such bright talk to severe critical analysis.

VIII. 1. 4. Te a. d. IX. Kal. Iunias subrostrani dissipant perisse ur de urbe (so M; perisse de urbe H) et foro toto maximus rumor fuit te a Q. Pompeio in itinere occisum. Ego qui scirem, &c.]. The Amsterdam MS. quoted by Graevius reads *perisse; sed ut de urbe*. If we adopt this, which would readily be corrupted to the reading of M, and put only a comma at *occisum*, we get good sense for the passage, 'When I heard details of your supposed murder, I knew the value of the report.'

VIII. 1. 4. uigens M; uigent H]. The latter is read by Klotz.

VIII. 3. 1. facito M; facio H; factito (all edd.)

VIII. 4. 5. Quidē mihi suadeas M T H; Quid mihi suadeas (edd.)]. The reading probably is *Quid de re mihi suadeas*. The stroke can signify the omission of *er*. Caelius probably was one of the creditors of Ptolemy.

VIII. 5. 2. Sic multum et diu ludetur atque ita diu ut plus biennium in his tricis moreretur M; moremur Ern.; moretur H]. There is a difficulty in taking *moretur* passively. Manutius compares the passive use of *fateor* in Cic. Rull. II. 57 (a very uncertain passage). Still deponents are occasionally found passively in good authors. Roby, § 734.

VIII. 8. 2. de patris M; de patriis Orelli; de patre H]. This latter is read by nearly all editors from Graevius' time.

VIII. 8. 6. neminem eorum . . . moram adferre oportere quominus de r. p. q. p. ad senatum referri]. Such is the reading of M and H; and the explanation given by Graevius, that *q. p.* stands for *quam primum*, seems reasonable enough; and it is adopted by Mommsen, St. R. I. 270, note 2. The usual reading since Orelli's time is *de r. p. p. R. Q.* = de republica populi Romani Quiritium.

VIII. 8. 8. qui praetores fuerunt neque in prouinciam (so M; prouincia H) cum imperio fuerunt]. M is no doubt right, no matter what Wesenberg (Em. Alt. p. 20) says.

It is decidedly the *lectio difficilior*; and in early Latin the ordinary distinction in the use of the cases with *in* does not seem to have been established. See Wordsworth (*Frag. and Spec. of Early Latin*), note on l. 1 of the *Lex Agraria* of 111 B.C., p. 451; and Ussing on *Plaut. Amph.* 177: cf. *Cic. Verr.* v. 98, *Quinct.* 22; *Prop.* 3. 9. 60.

VIII. 9. 1. *quam ne contentionis minime fuerit M; minimae (Baiter, Klotz); minimum H*. This latter seems the better reading, as we shall not have to supply a nominative for *fuerit*.

VIII. 9. 1. *Post repulsam uero risus facit: ciuem bonum ludit et contra Cæsarem sententias dicit: expectationem corripit; Curionem prorsus curionem obiurgatus; hac repulsa se mutauit*. So M. H omits *Caesarem*, no doubt wrongly. It reads: '*corripit Curionem. Prorsus Curionem non mediocriter obiurgat ac repulsa se mutauit.*' *Graevius* is delighted with this reading (*quam lectionem non potui non probare*); the latter portion of it, no doubt, for the first part is untranslatable. I should be inclined to supply another *corripit*, thus, '*expectationem corripit, corripit Curionem. Prorsus Curionem non mediocriter obiurgat ac repulsa se mutauit.*' The last sentence is very bald indeed; and one would like to see therein a gloss. But perhaps the word *Curionem* got repeated (as words do: see *Streicher*, pp. 136 *sqq.*), and we must not attribute to *Caelius Ciceronian* elegance.

There is a chronological difficulty in reference to this attack on Curio by Hirrus, viz. that Curio was as yet on the optimate side. *Manutius* supposes (with no great probability) that the attack was made because Curio and *Caelius* were fast friends. But perhaps Curio may have counselled caution, and to abstain from hurried action as regards Caesar, a course which Hirrus stigmatized as procrastination, and waiting for something to turn up. Renegades are ever for vigorous action.

VIII. 9. 2. Hoc mihi non est dubium; quo tibi magis scripsi ut ad hunc euentum te *pararis*]. So M. Orelli, Baiter, and Klotz read *parares*. H has *praepares*. This latter would stand. It is the prevailing idiom of Cicero to construct the present past with historical consecution (Pub. School Lat. Gram. § 229), but that need not have been the practice of Caelius.

Shortly after this passage H stops suddenly in the middle of a sentence at *puto etiam si ullam spem*, leaving quarter of a page unused. There is another Harleian MS. of Cicero ad Fam. (No. 2591) which I studied to some extent. Its arrangement of the beginning of Book VIII. is the first epistle, then the tenth, then three lines of the second down to *inquis* (126. 35, Orelli). After this, though on the same page of the MS., follows *mihi litteris ostenderis* (135. 24, Orelli), the words that immediately follow *spem*, where I have said H breaks off in the middle of a sentence. The remainder then of VIII. 9 is given, after it II. 12, next VIII. 11, and then the letters in due order to the end of VIII. This juncture is well worthy of remark: as yet I am not certain what conclusion to draw from it. The MS. (No. 2591) is decidedly of the M family, full of corrections by one who knew Latin fairly, and was a master at the art of erasing what was originally written. It has, however, its own interest; and I hope to say something about it on a future occasion. For the present I cannot trespass any further on the kindness of our learned editor.

LOUIS C. PURSER.

February, 1885.

MISCELLANEA CRITICA.

HORACE, *Odes*, I. 37.

. . . quae generosius
 Perire quaerens nec muliebrit
 Expavit ensem nec latentes
 Classe cita reparavit oras.

THIS is a well-known difficulty. *Quid obsecro est reparare oras classe?* asks Bentley, and proposes *penetravit*, and a dozen equally improbable conjectures have been made. I venture to propose the following simple explanation of the MS. reading. *Reparare* I think means here to 're-create.' Virgil has the well-known phrase *Phaeacum abscondimus arces*, and *reparare* is here used in a sense opposite of *abscondere*. When we go from Ireland to Wales we *reparamus* the latent shores of Wales; we *abscondimus* the Irish shores, which in their turn become *latentes*; when we return we *reparamus* those shores. Cleopatra did not by means of her swift fleet 're-create,' 'bring into sight,' a hidden shore. If this view is right, the line is one of the most poetical in this poetical ode, and I see no valid objection to it.

The last poem of CATULLUS thus appears in Ellis's edition:

Saepe tibi studioso animo venante requirens,
 Carmina uti possem mittere Battiadae,
 Qui te lenirem nobis neu conarere
 Telis infestum mittere in usque caput
 Hunc video mihi nunc frustra sumptum esse laborem,
 Gelli, nec nostras hic valuisse preces.
 Contra nos tela ista tua evitamus amicti
 At fixus nostris tu dabi supplicium.

The great difficulty of the construction *requires . . . ut*, the double epithet to *animo*, and the careless repetition of *mittere*, bids us look for emendation. I propose

Saepe tibi studioso animo *vernacula* *requires*
Carmina uti possem *vertere* Battiadae :

i. e. *vernacula* (vocabula) *requires* : 'seeking for words of our native tongue to translate (*vertere*) for you the poems of Callimachus.' For *requirere* used in this sense, compare Suetonius, Tib. 71 : *atque etiam in quodam decreto patrum cum* Ἐμβλημα *recitaretur, commutandam censuerit vocem et pro peregrina nostratē requirendam*. It seems that *vernacula* might pass through the stages of *venāda*, *venanda*, into *venante*. A noun is not wanted, as the expression is general. For *vernaculus* in this sense, see Varro, *R. R.* 3. 5.

LUCRETII, 5. 1010.

Illi imprudentes ipsi sibi saepe venenum
Vergebant, *nurui nunc* dant sollertius ipsi.

I had always considered the above emendation of the late Dr. Munro's as one of the great critic's least meritorious conjectures; he writes the second line as above in all his larger editions. The reading of his small text of 1860 is not any better :

Vergebant *nunc* dant *nuptis* sollertiu' sponsi.

The MSS. give a defective and corrupt line :

Vergebant nudant sollertius ipsi.

Lucretius is contrasting the uncivilized races of primitive men with the moderns. The former, he says, used, without knowing their deadly qualities, to pour out for themselves large draughts of poison. The moderns—

do what?—‘with greater cunning give poison to the daughter-in-law instead’: so Dr. ‘Munro’s late editions. ‘Now-a-days husbands give poison to their wives more cunningly,’ according to his early text; either reading being in my opinion extremely infelicitous and incongruous. I therefore ventured last year to lay before Dr. Munro the following view of the passage; and in the correspondence which passed between us he stated no objection to my view, and indeed appeared willing to accept it.

All medicines are poisons, and I believe Lucretius meant to contrast the unintentional, accidental drinking of poisons by uncivilized men with the intentional, careful practice of medical men in later ages, whose art consists in giving the right dose, neither more nor less. *Diluis helleborum certo compescere puncto Nescius examen? vetat hoc natura medendi.* I therefore proposed:

Illi imprudentes ipsi sibi saepe venenum
Vergebant, *medici* nunc dant sollertius *usi*.

I pointed out that *dare* was the technical word for a physician administering a dose (cf. *absinthia taetra medentes cum dare coguntur*, and many other instances), and appealed to *utor*, again and again used in the making up of prescriptions in Celsus; and *sollertius* was illustrated by *sollers cura medendi* in Ovid. Dr. Munro seemed to be willing to accept the view put forward, but suggested the following alternative reading:—

Illi imprudentes ipsi sibi saepe venenum
Vergebant, nunc dant sollertius *arte medentes*,

or *saepe medentes*. He did not, however, seem willing to part with the view that intentional poisoning on the part of the moderns is referred to—an idea which I hold is foreign to the passage.

Lucretius, 4. 1026.

Puri saepe lacum propter se ac dolia curta
Somno devincti credunt extollere vestem :
Totius umorem saccatum corpori' fundunt
Quom Babylonica magnifico splendore rigantur.

Puri is the MS. reading; an 'impossible contraction for *pueri*,' as Munro says; very difficult to explain as the adjective. The true reading is surely *Pupi*, 'little boys.' I suggested this to Dr. Munro some two or three years ago, but was deterred from publishing it, because in the only passage where I found the word *pupus* used (Varro, *ap. Non.* 156. 22: *sugentem pupum*) it seemed to refer to too early an age. But I find that, as Mr. Wordsworth says, the name *pupus* is given in inscriptions to children as old as thirteen years: *Frag. and Spec. of Early Latin*, p. 661.

PLAUTUS, *Asinaria*, 202 [1. 3. 51].

Vetus est 'nihili coactio est': scis cujus: non dico amplius.

Perhaps '*nihili coctio est*,' in this sense, 'it's no use trying to boil—you know what': referring to the Greek proverb λιθον ψευ.

Aulularia, *Prol.* 3.

LAR. (loq.) hanc domum
Jam multos annos est quom possideo et colo
Patri avoque jam hujus, qui nunc hic habet.

The hiatus after *patri* is indefensible, and has been got rid of by various conjectures. I propose: *Patre vivo avoque jam hujus*: 'during the lifetime of the father and grandfather of the present tenant.'

Aulularia, 250 [2. 2. 73].

Si hercle ego te non elinguandam dederò usque ab radicibus
Inpero auctorque sum ut me quovis castrandum loces.

Read : Inpero *ipse* auctorque sum.

Bacchides, 64 [1. 1. 33].

Penetrem me huiusmodi in palaestram, ubi damnis
desudascitur ;
Ubi pro disco damnum capiam, pro cursura dedecus !

It seems likely that *donis* is the true reading, not *damnis*.

Captivi, 891 [4. 2. 117].

HÆG. Aeternum tibi dapinabo victum si vera autumas !
ERG. Unde id ? HÆG. A me meoque gnato.

The verb *dapinare* is unknown ; and Ergasilus would scarcely have asked *unde id*, if Hegio had directly promised to give him his victuals. I suggest :

Aeternum tibi *id opinato* victum, si vera autumas,

‘consider yourself provided for for ever, if your news is true.’ Then the question of Ergasilus is natural : *opino* is the more Plautine form ; but *opinor* was regularly substituted by the scribes, even where *opino* is demanded by the metre : there are at least ten such passages : Langen, p. 64.

For *id . . . si*, cf. Pseud. 442 [1. 5. 27], *Id* nunc mirare *si* patrissat filius.

Casina, 446 [3. 2. 20].

Propter operam illius irqui improbi edentuli.

So the MSS., and so Geppert. The hiatus after *irqui* presents no difficulty, being *in diaeresi*; that after *improbi* is not justifiable. *olidi* has probably fallen out after *obi* and before *ede*: cf. Men. 825, *Post autem illic hircus olidus*.

Menaechmi, 427 [2. 3. 83].

MES. Non tu istas meretrices novisti ere. MEN. Tace
inquam

Mihi dolebit, non tibi, si quid ego stulte fecero.

The word which has fallen out after *inquam* is probably *verbero*, owing to *fecero*, with the same termination, coming underneath.

Menaechmi, 221 [1. 4. 3].

CYL. Quoiusmodi i homines erunt?

ER. Ego et Menachmus et parasitus ejus. CYL. Jam
isti sunt decem;

Nam parasitus octo hominum munus facile fungitur.

The hiatus in the last line seems illegitimate, and may be best got over by reading:

Nam parasitus octo hominum *unus* munus facile fungitur.

‘a single parasite eats as much as eight ordinary men.’
Compare Eubulus fr. inc. 1, cited by Ussing: Εἰσὶν ἡμῖν τῶν
κεκλημένων δύο ἐπὶ δεῖπνον ἄμαχοι Φιλοκράτης καὶ Φιλοκράτης.
Ἔνα γὰρ ἐκείνον ὄντα δύο λογίζομαι μεγάλους μᾶλλον δὲ τρεῖς.
Proper. 4. 6. 68: *Una decem vicit missa sagitta rates*.

THE MOSTELLARIA.

Professor Sonnenschein has given us a most interesting and scholarly volume in his edition of the *Mostellaria*.

The editor has, I think, succeeded in improving on his well-known edition of the *Captivi*. That edition led us to expect careful and discreet treatment of the *Mostellaria*; but we were not prepared by it for the many vigorous and telling emendations which Professor Sonnenschein has introduced into Plautus, many of them undeniably right. The editor evidently feels quite at home in his work, and is more in touch with Plautus than before. He does not bow slavishly to German generalizations, several of which, although backed by great names, are hasty and untrue, and are consequently doing great harm in Plautine criticism. Of the emendations introduced by the editor *de suo*, some thirty in number, the best are: I. 3. 121, *nimis male olere intelligas* (where the MSS. give *ni male*); III. 1. 30, *cape opsecro hercle aequom cum eo judicem*, where the MSS. omit *aequom*; the insertion of *usque* at IV. 2. 60: and at V. 2. 52, *Tranio, quiesce : sapias* where the MSS. give *qui esse : sapiis* (*quiesce* an old correction). The very original reading of 2. 2. 37, 38 is worthy of careful consideration.

But not only is there much new work of the editor's own, but much also has been obtained from others. The editor has adopted a method of procedure which is novel and worthy of imitation. He has sent his proof-sheets to several scholars who are studying Plautus, and he has embodied many of their conjectures in his notes. Thus a very large number of new and interesting emendations have been obtained. The work has thus assumed to some extent the character of an *ἔργον*; but as Professor Sonnenschein has been very careful to acknowledge his obligations, the several contributors can only feel pleased

and flattered at their names being mentioned among the *sospitatores Plauti*. Among those who have thus contributed are such eminent scholars as Dr. Robinson Ellis, Mr. J. S. Reid, Professor Nettleship, Professor Minton Warren, and others. It is scarcely necessary to remark that the latest results of German scholarship are faithfully presented to the reader.

Among the new emendations Ellis's *frit* (595) certainly bears away the palm. The MSS. having *nec erit quidem*, and the reading since Acidalius having been *ne γρῦ quidem*, Dr. Ellis gives *ne frit quidem*; *frit* being, according to Varro, a tiny particle in the top of an ear of corn, smaller than a grain.

I am pleased to see that the editor has thought several of my conjectures worthy of acceptance. I beg to advance the following fresh conjectures which have occurred on a re-perusal of the play:—In 21, *erum minorem* for *erilem* of the MSS.; 45, *vesci victibus* (MSS. *vivit victibus*). In 213:

Ita hanc corrumpit mulierem malesuada Vttilena.

I think it likely that the last word may have been *Vulpilena*, an attempted translation of *κυναλώπηξ*. The 904th verse I would write thus:

TR. Quid tibi visumst mercimoni? TH. *Mihine*? Totus gaudeo.

A little further on, 1010 [4. 3. 18]:

TH. Minas quadraginta accepisti, quas sciam,
A Philolachete. SI. Numquam nummum quod sciam:

quas sciam of the MSS. has been altered to *quod sciam* by Guiet, and this reading is accepted by Ussing and Sonnenschein. But, in *quasciam* of C, we should, I fancy, change but one letter, and read:

Minas quadraginta accepisti *quaspian*
A Philolachete.

Sciam underneath then caused the slight change: compare *Pseud.* 484 (1. 5. 68), *Ecquas viginti minas . . . Paritas ut a me auferas?*

In 293, *mi ornata's satis* (*mi* om. in MSS.). Compare *mi formosa satis* of Propertius. In 407 *prior siet* (M *pro-prior siet*): cf. Horace's *Ambigitur quotiens uter utro sit prior*; 618, *ei iube* (*ei* omitted in M: *e* precedes); 619, *obdier* (*obi* M); 629, *crevit* as alternative for *cedit* (*credit* M); 682, *eas percontare* (*eas* omitted after *-as* in M); 187, *Nunc ista* (*Non stai tam* M); 366, *Piraeo adest*, 'he is close at hand from the Piraeus' (*Piraeo* omitted in M after *opsecro*); at 363:

Tandem adest obsonium, eccum Tranio a portu redit.

Tandem is not in the MSS. Read:

'*Adest* adest obsonium, eccum Tranio a portu redit.

Compare Ennius, *Fab.* 28 (Müller):

Adest, adest fax obvoluta sanguine atque incendio.

At 259:

Una opera *te* ebur atramento candefacere postules.

Te is not in the MSS. Read:

Uno opere ebur *atro* atramento candefacere postules.

At 55 I do not like the un-Plautine *carnificium*, and would read:

O *carnificum te* cribrum, quod credo fore.

This would be like Catullus's *A tum te miserum malique fati*, where a similar threat follows.

Mr. Sonnenschein has adopted several emendations, excellent in themselves, for the purpose of removing hiatus in the diaeresis of the Iambic septenarius. But it seems certain that hiatus was permitted here; and so were short syllables; the Romans, in fact, treated this verse almost as if it were two verses, and consequently allowed themselves the same latitude in treating syllables at the end of

the first member as they did at the end of a line. The nature of the verse lends itself to this. It breaks naturally into two. Thus in English we write :

There was an old wife lean and poor ;
Her rags scarce held together.

We naturally make two verses of it. But how greatly would the splendid trochaic septenarius lose in dignity if broken into two short lines. Take Archbishop Trench's fine poem beginning—

Though till now ungraced in story, scant although thy waters be,
Alma, roll those waters proudly, roll them proudly to the sea.

How much this would lose of its grandeur if broken into two lines. And we find that the Romans were less strict in observing diaeresis in the trochaic than in the iambic septenarius. It follows, then, that such a line as

Quam te me vivo unquam sinam | egere aut mendicare,

wants no defence, and can be supported by numerous instances from Plautus. Such a line as this, which Mr. Reid proposes to substitute for it, is less likely to have been composed by Plautus—

Quam te me vivam unquam sinam in | digere aut mendicare.

On this subject all the metricians are agreed. Even C. F. W. Müller does not attempt to remove hiatus in the diaeresis of an Iambic septenarius, though he refuses to allow it in the diaeresis of a trochaic septenarius. W. Christ sums the matter up well, *Metrik*, p. 342 :—
'Mit der grösseren Regelmässigkeit der Cäsur hängt es auch zusammen, dass die lateinischen Komiker am Schlusse des 1ten Kolon die Freiheiten des Verschlusses zuließen,

so Plautus in mehreren Versen hintereinander in der *Asinaria*, III. 342, f. 61. ff.:

Hinc me amantem ex aedibus ejecit hujus mater.
Argenti viginti minae ad mortem me adpulerunt.
Sed tibi si viginti minae argenti proferentur,
Quo nos vocabis nomine? liberos non patronos.
Id potius viginti minae hic insunt in crumina.'

Poenulus, 1383 [5. 7. 10].

Leno, rapacem te esse semper credidi:
Verum etiam furacem qui norunt magis.

I propose to write—

Leno, *ego* rapacem te esse semper credidi,
Verum etiam *ei* furacem, qui norunt magis.

Pseudolus [1. 3. 117].

Quid ais? quantum terra tegit hominum perjurissime.
tegit B. C., which will not scan, and Ballio was not dead or buried. A is said to have *tetigit*. Hence I propose:

Quid ais? quantum terra TETULIT hominum perjurissime

Cf. Horace *Sat.* 1. 5, *animae quales neque candidiores*
Terra tulit. Id. *Sat.* II. 4, *Hos utinam inter Heroas natum*
tellus *me prima* tulisset. [*In terra degit* or *terram tetigit*
are read by editors.]

Pseudolus, 459 [1. 5. 44].

Si. Statum vide hominis, Callipho, quam basilicum.
Bene confidenterque adstitisse intelligo.

By all means strike out *que*. *Bene confidenter*, 'in quite self-sufficient fashion,' is the sense required, and is thoroughly idiomatic in form.

Poenulus, 451 [2. 6].

Sex immolavi agnos, nec potui tamen
Propitiam Venerem facere ut esset mihi.

Jam seems to have fallen out between *immolavi* and *agnos*: cf. *Tres accepi jam epistolas* in Cicero. In the next line I do not see any reason against inserting *aes* before *esset*. Money was what Lycus wanted: it was in the hope of gaining money that he sacrificed to Venus.

Poenulus, 239 [1. 2. 31].

Soror, cogita amabo item nos perhiberi
Quasi salsa muriatica esse autumantur
Sine ómni lepóre et sine † suavitáte.

Read :

Sine ómni lepóre et *suavi* suavitáte.

Compare *Pseud.* 885 [3. 2. 87]: cenam conditam dabo hodie atque *suavi suavitáte* condiam. *Ibid.* 65 [1. 1. 163], *suavisuaviatio*.

Poenulus, 772 [3. 4. 13].

AG. Vidistis, leno quom aurum accepit? AD. Vidimus.
AG. Eum vos meum esse servom scitis. AD. Scivimus.
AG. Rem advorsus populi † saepe leges? AD. Scivimus.

For the almost certainly corrupt *saepe* Ritschl proposed *fieri*, which Götz accepts. Much nearer and much more likely to be corrupted would be *coepti*, infinitive passive of *coeptio*, *coeptere*, a form which I have not met elsewhere.

VARRO, *Res Rusticae*, 3. 2. 9 (Keil).

Axius aspicit Merulam et 'Quid gus inquit' est ista villa si nec urbana habet ornamenta neque rustica membra?

The mysterious *gus* is enclosed in brackets by Keil. We should, however, read: 'Quid *gurgusti*' inquit 'est ista villa *cet*;' What sort of a hovel is that villa, if it has neither the ornaments of a town house nor the offices of a farm?'

R. R. 1. 2. 27.

Stolo subridens, 'Dicam' inquit 'eisdem quibus ille verbis scripsit vel Tarquennam audiui, cum homini pedes dolere coepissent qui tui meminisset ei mederi posse. Ego tui memini, medere meis pedibus, terra pestem teneto, salus hic maneto in meis pedibus.'

An old charm for curing pains in the feet, given by Saserna, is here ridiculed by Stolo.

The charm seems to me to begin after *scripsit*, and I think it ran thus: 'VEI Tarquenna (vocative), nam audiui cum homini pedes dolere coepissent qui tui meminisset TE ei mederi posse: ego tui memini *cet*.'

I fancy *Veius Tarquenna* was the name of an Etruscan personage, a sort of Merlin, with whom Horace connects *Veia*, the name of the accomplice of Canidia and Sagana in the fifth Epode: here *vei* was corrupted into *vel*. The insertion of *nam* is about equally probable as its omission; but *te* must by all means be restored between *t* and *e*.

CICERO, *Ad Att.* 4. 2. 3.

subito ille in concionem escendit, quam Appius ei dedit: nuntiat iam populo pontifices secundum se decrevisse, me autem vi conari in possessionem venire.

Malaspina's codices have *nuntiante populo*; hence I would read: nuntiat *hianti* populo, 'he tells the gaping people': ready to believe anything.

Ad Att. 5. 4. 2.

De illo altero quem scribis tibi visum esse non alienum, vereor adduci ut nostra possit, et tu ais *δυσδιάγνωστον* esse. Equidem sum facilis, sed tu aberis, et me absente res. Habebis mei rationem.

Cicero is writing of Tullia's second marriage contract. I would read: *et me absente res* haerebit. *Habebis mei rationem*. The expression *haeret haec res* is common in Plautus.

PROPERTIUS, 2. 32. 42.

Cur haec tam dives? quis dedit? unde dedit?

Quis dedit is to the point; not so the last question. Perhaps: *unde nitet?* (scil. *haec*), 'whence comes her finery?' For the form of expression, cf. Phaedr. 3. 7: *unde sic quaeso nites?*

3. 8. 4.

Cur furibunda mero mensam propellis, et in me
Proicis insana cymbia plena manu?

Insanae occurs in the preceding pentameter: *vocis et insanae tot maledicta tuae*. Should we not here read *infesta*? cf. 1. 8. 16, *infesta . . . manu*.

3. 9. 49.

Celsaque Romanis decerpta Palatia tauris
Ordiam et caeso moenia firma Remo.

Rather *Romuleis . . . tauris*. The Palatine and Romulus are regularly brought together in the legend.

3. 18. 21.

Sed tamen hoc omnes, huc primus et ultimus ordo.

Probably: Sed *manet* hoc omnes. Cf. Horace: *sed omnes una manet nox*, and *Hoc quoque te manet*, and so frequently.

4. 1. 107.

Aspicienda via est caeli verusque per astra
Trames, et ab zonis quinque petenda fides.

The trames is the ecliptic. For *verus* perhaps the true reading is *varus*. The ecliptic, which 'diverges' from the equator, might so be called (*obliqua rota*, 4. 1. 82).

4. 4. 20.

Vidit harenosis Tatium proludere campis
Pictaque per flavas arma levare jubas.

Probably *frena* should take the place of *arma*. Tatius naturally lifts the embroidered reins through his horse's mane. How his 'arma' could come there is a mystery: cf. Ov. *Am.* 3. 4. 15: *Frenaque* in effusa laxa jacere juba.

4. 5. 35.

Ingerat Apriles Iole tibi, tundat Amycle
Natalem Mais Idibus esse tuum.

Neither *Iole* nor *Amycle* is sound in my judgment. For *Iole* read HYALE; for *Amycle* read OMICHLE. As to *Hyale*: the omission of the aspirate, and the change of *y* to *i*, and the reverse processes, in proper names, are constant in all Latin MSS., even the best—for instance, in

Catullus, for *Hydrochoi* the MSS. give *idrochoi*; in Plautus, Capt. 3. 5. 75, for *Hippolytum* the MSS. give *yppolitum*. In both those instances both these corruptions occur. What more likely, then, once *Hyale* had been corrupted to *iale*, for the learned scribe to think of *Iole*, the concubine of Hercules? But slaves were not given names from heroic story. They were, however, often quaintly derived from some fancied resemblance to an external object: think of *Strobilus*, *Stalagmus*, *Staphyla*, *Scapha*, *Astaphium*. As to *Omichle* (ὀμίχλη), the case is stronger, for the better class of MSS. all point to it. N, for instance, though it has *amicle*, has *o* written over the *a*. Now remember *Drosis*, *Rhanis*, *Psecas*, *Nephele*, as proper names of maid-servants, and say does not *Omichle* come into this category exactly?

And so does *Hyale*. For Propertius, as he here joins the name to *Omichle*, probably connected the word directly with ὕω, 'to rain,' not with ὕαλος, ὑάλη, 'glass.' Ovid certainly connects it with ὕω when he places *Hyale* among the attendant nymphs of Diana, Met. 3. 171: Excipiunt laticem Nepheleque, Hyaleque, Rhanisque, et Psecas et Phiale.

Just as Ovid joins *Hyale* to *Nephele*, 'cloud,' and *Rhanis*, 'rain-drop,' so here Propertius gives her as a comparison *Omichle*, 'mist.'

4. 8. 57, 58.

Phyllidos iratos in vultum conicit unguēs:

Territa vicinas Teia clamat aquas.

Perhaps '*vicini aquam*!' Scil. '*date, ferte*,' or '*vicinos aquam*,' 'calls on the neighbours for water'! In any case there seems an allusion to the common cry of

‘Water, neighbours’! raised in case of fire; in Greek the expression was ὕδωρ ὦ γείτονες. See Ar. Thesm. 241. Although there was no danger of fire, Teia raised the cry. Just so when Mr. Pickwick was in danger of drowning, Mr. Tupman ran off across the country, shouting ‘Fire!’ with all his might and main.

A. PALMER.

HORATIANA.

Carm. I. i. 7.

Maecenas atavis edite regibus,
O et praesidium et dulce decus meum,
Sunt quos curriculo pulverem Olympicum
Collegisse *iuvat*, metaque fervidis
Evitata rotis palmaque nobilis
Terrarum dominos evehit ad deos ;
Hunc, si mobilium turba Quiritium
Certat tergemini tollere honoribus ;
Illum, si proprio condidit horreo,
Quidquid de Libycis verritur areis.
Gaudentem patrios findere sarculo
Agros Attalicis condicionibus
Numquam dimoveas, ut trabe Cypria
Myrtoum pavidus nauta secet mare.
Luctantem Icariis fluctibus Africum
Mercator metuens, otium et oppidi
Laudat rura sui ; mox reficit rates
Quassas, indocilis pauperiem pati.
Est qui nec veteris pocula Massici
Nec partem solido demere de die
Spernit, nunc viridi membra sub arbuto
Stratus nunc ad aquae lene caput sacrae.
Multos castra iuvant et lituo tubae
Permixtus sonitus bellaque matribus
Detestata. Manet sub Iove frigido
Venator tenerae coniugis inmemor,
Seu visast catulis cerva fidelibus,
Seu rupit teretes Marsus aper plagas.

Me doctarum hederæ præmia frontium
 Dis miscent superis, me gelidum nemus
 Nympharumque leves cum Satyris chori
 Secernunt populo, si neque tibia
 Euterpe cohibet nec Polyhymnia
 Lesboum refugit tendere barbiton.
 Quodsi me lyricis vatibus inseres,
 Sublimi feriam sidera vertice.

THE construction of the seven first lines may be seen from the following analysis of the logic of the whole Ode:—

*Sunt quos collegisse iuvat, et sunt quos
 Meta palmaque evehit ad deos—1-6.
 Hunc iuvat, si, &c.; illum iuvat, si—7-10.
 Other characters—11-21.
 Multos castra iuvant: Manet
 Sub Jove frigido—22-28.
 I am a poet—29-36.*

In brief, tastes differ.

To justify this by the Latin:—

Hunc, being emphatic, commences a clause; it would be weak Latin order to say *evehit ad deos hunc*. Horace evidently takes the highest objects of Greek and Roman ambition. The estimation of Ὀλυμπιονῆται is seen in Cic. *Tusc.* I. xlv. 111, 'morere Diagora; non enim in caelum ascensurus es;' and *pro Flacco*, xiii. 31, 'Olympionices, hoc est apud Graios prope majus et gloriosius quam Romae triumphasse.' The more practical Roman preferred office, 'magna haec et nimium fortasse Graeci putant' (Cic. *Tusc.* ib.), and wealth.

But the great difficulty is in *terrarum dominos*. It is applied by Lucan to Eastern kings; but these, according to Roman notions, resembled gods in being above Law.

Nor were Olympic honours, as we see by the case of Diagoras and others, at all confined to sovereign princes. Ovid uses *Terrarum dominos* of the gods, *Pont.* i. ix. 36; and the term *dominos* was objectionable then in Roman eyes applied to a freeman amongst freemen. This does not affect its propriety in Vergil, where the Romans are contrasted with the rest of mankind. So, terr. dom. = deos.

As to 'evehit ad deos,' cf. Ov. *Fast.* i. 210:

tetigit summos vertice Roma deos;

Sil. Ital. i. 611:

aequantem superos virtute senatum;

id. xiv. 722:

superos aequantem laude Camillum;

Lucret. i. 80:

nos exaequat victoria caelo.

I. iii. 5-7.

The prose would be:—O Navis quae Vergilium creditum debes, te ut reddas precor; *i. e.* reddat quia debet, et debet, quia Vergilius ei creditus est.

As to *creditus*, cf. Catull. LXIV. 213:

gnatum ventis concrederet Aegeus.

I. iv. 8.

dum graves Cyclopum
Volcanus ardens urit officinas.

Urit officinas = wastes them with his continual fires:
cf. Ovid, *Fast.* iv. 473:

Antraque Cyclopum positis exusta caminis;

Silius Ital. xiv. 56:

Lipare vastis subter depasta caminis;

Propert. II. i. 54:

Colchis Iolciacis urat aena focus.

Volcani officinae are the caves which he burns away.

I. v. 1.

Multa . . . in rosa, i.e. crowned. The whole emphasis is on the personal advantages of her lover—*gracilis, perfusus odoribus*; and the cave has got one epithet already, *grato*.

As to *in*, cf. Val. Flac. i. 641;

trifida Neptunus in hasta;

and *id.* viii. 133:

rapta victor consistit in hasta.

I. v. 5.

Simplex munditiis, i.e. with one characteristic running through her toilet—the unity of elegance, not the incongruity of bad taste.

I. xv. 15.

grataque feminis

Imbelli cithara carmina divides.

Carmina divides: this, I believe, is the true sense of ἐντέμνων in the *Agamemnon*. Ἐντομον, insectum, is the divided *insect*, like the wasp.

Wickham's ἀπὸ κοινοῦ is misleading; a verb in Latin takes a noun as its case, and the rest is grouped around; i.e. 'carmina dividit feminis, quae carmina sunt grata'; not surely, 'carmina dividit, quae carmina sunt grata feminis.'

I. xvii. 9.

Nec Martiales Haediliae lupos.

If we read *haeduleae* with Bentley, we have a most frigid division of labour:

she-goats are not afraid of snakes,
nor *kids* of *wolves*;

but the she-goats do all the browsing, leaving the no less intrepid kids without food.

Whereas the sense required is—She-goats fear neither snakes nor wolves, but browse in peace, while you play.

I. xx. 9-10.

Caecubum et prelo domitam Caleno
Tu *bibes* uvam.

The future expresses moral certainty: *I know you will* be drinking expensive wines; I cannot. Cf. Verg. *Geor.* iii. 409-413:

timidos *agitabis* onagros,
Et canibus leporem, canibus *venabere* dammas;
Saepe volutabris pulsos silvestribus apros
Latratu *turbabis* agens, montesque per altos
Ingentem clamore *premes* ad retia cervum.

I know you will hunt, and if so you must mind your dogs. So Lucr. iii. 919-920: 'At nos . . . deflebimus,' 'we will be weeping.'

Horace apologises for asking Maecenas to his wines, cheap though they are sound.

As to the future imperfect, cf. the legal sense, Gaius ii. 232, cum heres morietur—on his death-bed; Hor. *Carm.* ii. xiv. 11-12:

Sive reges
Sive inopes erimus coloni:

we must be either ; IV. i. 21-22 :

Illic plurima naribus
Duces thura ;

i.e. when you go there ; IV. ii. 33 and 41, *concines*, I know you will ; I. vi. 1, *laudabunt alii*, as I know they will ; II. iii. 17, *cedes*, you must ; II. x. 23, *contrahes*, you must ; II. xii. 10, *dices*, I know you will. See *post*.

I. xxviii. 2.

*Te maris et terrae numeroque carentis arenae
Mensorem cohibent, Archyfa.*

Cohibent is certainly 'keep in,' 'hold down': *cf.* III. iv. 80 :

trecentae
Pirithoum cohibent catenae ;

III. xiv. 22 :

nodo cohibere crinem ;

and *Epist.* II. i. 255 :

Claustraue custodem pacis cohibentia Janum.

Hence the ode reads as a monologue by the unlaidd ghost of a drowned seaman, to this effect:—

All men die: even the greatest of astronomers, whose tomb I am looking at, is confined to the grave: but *I* am unburied—wherefore do *you*, my fellow-sailor now alive, bury me, as you hope for burial yourself.

I. xxxii. 1.

Poscimur, *i.e.* a populo, is the converse of *poscit Apollo-*
linem, *i.e.* vates, *xxxi.* *Cf.* Propert. IV., vi. 69 :

Citharam jam poscit Apollo.

I. xxx. 15.

cunque ;

Horace uses

quandoque (C. IV. i. 17 ; ii. 34)

for quandocunque. The fourth book is the most elaborate of his works. Who then can say that he might not have used *cunque* in the first book, which is obviously a collection of experiments in lyrical Latin ?

I. xxxv. 37.

Diffingas = make into a new species ; *defingas* is to unmake, the first step in the process of remaking.

I. xxxvii. 24.

Classe cita reparavit oras.

Meineke's

sollicitare paravit oras

only deserves mention to prove his want of ear.

Re has its usual sense ; in itself, it merely denotes change, although change may be pushed to contrariety of the first condition.

II. xi. 21-24.

Quis devium scortum eliciet domo

Lyden ? eburna dic age cum lyra

Maturet, incomptum Lacaenae

More comam religata nodum.

Ritter's construction is ridiculous : Let some one entice Lyde out of her own house, and then when he has enticed her out, she is to be again enticed to Horace's. The word *scortum* shows that her coyness was put on, and her retired

residence had probably the same motive. We may therefore return to the old construction : *Go someone, go for quiet Lyde ; tell her not to lose any time, but bring her lyre, and come as she is.*

Bentley's argument, that she could not hold the lyre and tie up her hair at the same time, is decisive in favour of putting a stop at *maturet*. As to *maturet*, the word in Virgil is opposed to *properare* :

Frigidus agricolam si quando continet imber
Multa forent quae mox caelo properanda sereno
Maturare datur (Gi. 259-261).

Aulus Gellius (x. 11), Macrobius (vi. 8), point out that there is an element of deliberation in *maturare* which is excluded from *properare*, so that this passage cannot be safely illustrated by

Dic et argutae properet Neerae
Murrheum nodo cohibere crinem (III. xiv. 21).

At all events, Lyde is allowed more time than Neaera.

The two lines describing the arrangement of the hair are still more difficult : *nodo* is a mere conjecture ; this necessitates *nodum*. Then of *in comptum*, shall we read two words or one ? In favour of construing *in* with *nodum*,

(1), *c. acc.* *In* is used of the mode of dressing the hair—

in orbem, Juv. vi. 496.
in nodum, Mart. Sp. iii. 9.
in annulos, Sen. de brev. v. c. 12.
in nodum, de ira, iii. 26.
in gradus, Quintil. i. 6.

(2). In *comptum nodum* = trim ; whereas *incomptum nodum* = in a rough knot, like *horrentem capillum detorquere*, Tac. G. 38.

(3). In the two places, where *incomptus* is used of the hair, it suggests roughness.

(a). *incomptis Curium capillis*, C. I. xii. 41.

(b). *Canidia brevibus implicata viperis*

Crines et incomptum caput, Ep. v. 15-16.

(c). As applied metaphorically to verse, it denotes slovenly, A. P. 446.

(4). Where there is a *nodus*, it is not *incomptus*, as *como* denotes arrangement—co-emo. If it be replied, that every *nodus* then is *comptus*, the rejoinder is, *comptus* implies a certain degree of elaboration—

comptos arsit adultera (IV. ix. 13)

Crines,

where *comptos* refers to the κέρη ἀγλαῖ, Paris.

As to *Lacaenae more*, Vergil's

dederatque comam diffundere ventis (A. i. 319)

is not inconsistent: Venus might tie back her hair in a knot, to keep it off her face and leave the ends free, *diffundere ventis*. This arrangement may be seen in the Pompeian pictures, or in the 'Toilette of the Bride,' left-hand figure, fig. 471, *Life of Greeks and Romans*. The result is, analysis is in favour of reading—

cum lyra

Maturet, in comptum (Lacaenae

More) comam religata nodum.

II. xviii. 14.

Satis beatus unicus Sabinis.

Beatus is wealthy and not happy, and so *unicus* would mean his only source of income; for his town house would bring in no returns, or his box at Tibur.

Mr. Wickham, *Introd.* p. xxix., overlooks the difference between *vel* and *aut*. The passage from Suetonius is: *vixit plurimum in secessu ruris sui Sabini aut Tiburtini*: i. e. at his country-place in the Sabine, or at his country-

place in the Tiburtine district. *Aut* never gives 'two alternative designations' of the same thing.

III. iv. 38.

Fessas cohortes abdidit oppidis.

Abdidit = 'penned up' his fierce soldiery, like wild beasts in their cages. Cf. Lucan, x. 445-6:

Sic fremit in parvis *fera* nobilis *abdit*a claustris
Et frangit rabidos praemorso carcere dentes.

III. iv. 49-50.

Magnum illa terrorem intulerat Iovi
Fidens juvenus horrida brachiis.

Newman finds inconsistency between this clause and l. 48: 'imperio regit unus aequo.' But the pluperfect *intulerat* contrasts the past alarm with the present calm.

III. xi. 18.

quamvis furiale centum
Muniant angues caput *ejus*.

Ejus = the brute, the kind of monster I was describing. Cf. Sall. *Catil.* 55: Sed incultu, tenebris, odore foeda atque terribilis *ejus* facies est, *i. e.* as you can imagine from the description.

III. xxvi. 11-12.

Regina, sublimi flagello
Tange Chloen semel arrogantem.

Regina, feminine of *Rex* = lawless despot = Sultana

with the whip, the emblem of sovereignty. Cf. Juvenal, x. 109 :

Ad sua qui domitos deduxit flagra Quirites,
and

Διὸς μάστιγι δαμέντες ;

the whip as an emblem is taken from Assyria and Egypt.

This may explain the passage in Martial :

. . . rogabatur felixque vetusque sodalis
Et cujus laxas arca flagellat opes.

II. xxx. 3-4.

Flagellat is the same metaphor from the taskmaster's whip, and *laxas* is 'unrestrained,' 'lavish'; hence *who has at his absolute disposal unlimited funds*.

Cf. v. xiii. 6.

libertinas arca flagellat opes ;

IX. lx. 2 :

Roma suas aurea vexat opes ;

Tac. *Ann.* xv. 42 :

viribus principis illudere.

For the semi-personification of money, cf. Pers. ii. 50-51 :

donec deceptus et exspes
Nequicquam fundo nummus suspiret in imo.

IV. ii. 49-52.

*Teque, dum procedis, io Triumphe,
Non semel dicemus, io Triumphe,
Civitas omnis, dabimusque diviis
Thura benignis.*

Teque is the preponderant reading ; and *te*, in line 53,

is kept sufficiently distinct in its application to Iulus by the interposition of the clause—

dabimusque divis
Thura benignis,

and by the antithesis to *me*, l. 54.

Epod. ii. 33.

Aut amite levi rara tendit retia.

Lēvi is more in keeping with *rara* and *turdīs* than *lēvi*.

A smooth pole might be used in catching mastodons, and the mast of some tall ammiral is *lēvis*, but not *lēvis*. Etymology is in favour of *āmite*.

Epod. v. 87–88.

*Venena magnum fas nefasque non valent
Convertere humanam vicem.*

In the usual Latin order *venena* is the object of *convertere*: poisons are poisons in this world—*humanam vicem*—in spite of the great distinctions of right and wrong. Therefore supernatural vengeance is called for, and vengeance after death, quae vis deorum est manium; and my ghost will haunt you, diris agam vos.

Convertere is to turn round: ‘considerate quam conversa rerum natura est’ (Sall. *Hist.* i.)

As to *vicem*: *vicem* is ‘change,’ ‘turn,’ ‘sphere,’ defined by a genitive or adjective: e. g. *nostram vicem*, the turn or spell that is mine (Cic. *ad Fam.* i. 9. 2); *utrum censis me vicem aerarii praestare* (Sall. *Hist.* iii.)

Hence *humanam vicem* is ‘the sphere of humanity’ = ‘in this world.’

What force is there in saying ‘spells do not make foul fair’? This is not true: they do, for the time being, make

foul fair, as in the case of the innocent boy. But there is every force in saying '*Morality cannot change spells in this world*'; but the supernatural world will avenge me;' therefore *diris* agam vos.

As to *diris*, cf. Liv. xl. 56:

umbrae insontis filii eum *diris* agitabant.

As to *magnum*, cf. Magnis diis, Verg. *Aen.* iii.

As to *vicem*, cf. Catull. LXIV. 68-69:

Sed neque tum mitrae neque tum fluitantis amictus

Illa vicem curans

(i. e. 'the state of').

Sat. I. iv. 11.

Cum fueret lutulentus, erat quod tollere velles.

The imperfect *velles* expresses impossibility; hence = 'there was something you would sooner have removed than retained.' If we make it = 'there was something you would like to have adopted,' what is there to prevent such adoption?

Horace adds, x. 50-51:

saepe ferentem

Plura quidem tollenda relinquendis.

This is decisive; *saepe* must denote the exceptional failing, and not the merit to which Horace gives the highest praise; and therefore *relinquendis* = *retinendis*, settles the question.

Epist. I. iii. 31-32.

male sarta

Gratia nequidquam coit.

Cf. Ovid, *Trist.* IV. iv. 41-42:

Neve retractando nondum coeuntia rumpe

Vulnera;

Ovid, *Pont.* I. iii. 87 :

si possint nostra coire

Vulnera ;

Propert. III. xxiv. 18 :

Vulneraque ad sanum nunc coiere mea.

Epist. ix. 47-48.

Imperat aut servit collecta pecunia cuique

Tortum digna sequi potius quam ducere funem.

Money ought to be means, not an end : in mechanical language, it should be the weight moved and not the power which moves it. Tortum is not twisted in strands, but strained by the pull taut. Cf.

tortos incidere funes, (Verg. A. iv. 575)

as the ships were riding at anchor.

As to sentiment, cf. Pindar's

κρέσσινα πλούτου μέριμναν. (P. viii. 96.)

In

tegumen torquens immane leonis, (Verg. A. vii. 666)

torquens is *stretching with his vast bulk* ; the skin is tight for him.

C. III. ix. 13-14.

Me torret face mutua

Thurini Calais filius Orniti,

i. e. Me torret Calais amore quem a me sumserat mutuum : I love C. ; but C. loved me first, and thereby made me love him.

The second clause is contained in the simple word *mutua*. Mutuum always requires the verb *dare* or *sumere*, expressed or understood : *face mutua*, with the flame I lit in him.

These notes were written many years ago (1885). As they

were the result of an independent study of the text, I leave them as they are. Since then some of the points have been considered by some eminent scholars. Mr. Munro and Mr. Verrall have discussed C. I. xx. Mr. Munro proposed for *tu bibes* in that ode, *tu vides*; and Mr. Verrall suggests *invidet*, in the sense of you look askance at.—*Studies in the Odes of Horace*, p. 146.

The words *mea nec Falernae necessitate tu* as an antithesis. This of course is consistent with Mr. Munro's *tu vides*. But if Maecenas provides his own wine, why offer him vile Sabinum? If we press the words, we have *potabis* significant of a hearty draught, as opposed to *bibes*. *Bibes*, then, may be taken *you will be for sipping* Caecuban; but I can quote no passage where the future signifies what you would begin to do, there being no chance of beginning. In *Ep.* I. x. 24, Prof. Wilkins takes the reading, *naturam expelles furca*, as 'expressing the notion of an incomplete action—a fruitless endeavour.' *Tu bibes* may thus mean: if you call for Caecuban, I have not got it. What is required is an undoubted use of the Latin future like αἰμαχῆ.

Epist. I. i. 19.

Et mihi res non me rebus subjungere conor.

Prof. Wilkins: 'I endeavour to subdue all events and circumstances to my own enjoyment, and not to become a slave to circumstances.' Not so; the first clause is Epicurean—I make the world suit me; the second is Stoic—I make myself suit the world, the end of the Stoic.

Epist. II. ii. 24.

Stultus cupidusque bibisset.

An instance of the carelessness of reference amongst the ancients. The companions of Ulysses had no warning

against the cups of Circe. They were warned against eating the oxen of the Sun.

Epist. I. iii. 26.

frigida curarum fomenta.

There is nothing essentially significant of heat in *fav*, though, no doubt, the association is in that direction; and fomenta thus may mean, in the *curiosa felicitas* of Horace, that which tends to feed care, but, being frigida, chills genius, *i. e.* hypallage = frigidarum curarum fomenta.

Epist. I. xx. 28.

quo duxit Lollius anno.

The point here has been misunderstood. No one denies that *collegam dicere* is used of a magistrate making an appointment in virtue of his *imperium*, for the reason that anyone with *imperium* could do anything he pleased while in office. I must again refer to the account of the transaction in Dio Cassius:

ἐν ᾧ δὲ ταῦτα ἐγένετο, ὁ Αὐγουστος εἰς Σικελίαν ἦλθεν, ὅπως καὶ ἐκείνην καὶ τὰλλα τὰ μεχρὶ τῆς Συρίας καταστήσῃται. Καὶ αὐτοῦ ἐνταῦθα ἔτι ὄντος, ὁ δῆμος τῶν Ῥωμαίων τοὺς ὑπάτους χειροτονῶν ἱστασάσεν, ὥστε καὶ ἐκ τούτου διαδειχθῆναι ὅτι ἀδύνατον ἦν δημοκρατοϋμένους σφᾶς σωθῆναι. Μικροῦ γοῦν τινος ἐν τε ταῖς ἀρχαιρεσίαις καὶ ἐν ταῖς ἀρχαῖς αὐταῖς κυριεύοντες ἔθορύβησαν. Ἐτηρέϊτο μὲν γὰρ ἡ ἑτέρα χώρα τῷ Αὐγούστῳ, καὶ διὰ τοῦτο Μάρκος Λόλλιος κατ' ἀρχὰς τοῦ ἔτους μόνος ἦρξεν· ἐκείνου δὲ μὴ δεξαμένου αὐτὴν Κόϊντός γε Λέπιδος καὶ Λούκιος Σιλανὸς ἐσπουδαρχίασαν, καὶ οὕτω γε πάντα συνετάραξαν ὥστε καὶ τὸν Αὐγουστον ὑπὸ τῶν ἐμφρόνων ἀνακληθῆναι. ἐπειδὴ δὲ οὐχ ὑπέστρεψε μὲν, ἐλθόντας δὲ αὐτοὺς πρὸς αὐτὸν ἀπέπεμψεν ἐπιτιμῆρας σφίσι καὶ κελεύσας ἀμφοτέρων αὐτῶν ἀπόντων τὴν ψῆφον δοθῆναι, οὐδὲν μᾶλλον ἡσύχασαν, ἀλλὰ καὶ πάνυ αὐθις διηνέχθησαν, ὥστε τὸν Λέπιδον ὀψέ ποτε αἰρεθῆναι.—xliv. 6.

Here is an election, and not *imperium*. See HERMATHENA, iii. p. 137.

VERGILIANA.

Ecl. iv. 60.

Incipe, parve puer, risu cognoscere matrem.

Risu = ridens ; *cf.* Catul., lxi. 221-225 :

Torquatus volo parvolus

. . . . Dulce rideat ad patrem

Semihiante labello ;

and so win a smile in return : if you don't, take my warning 'cui non risere parentes,' etc. (l. 62) ; *cf.* Stat. *Silv.*, v. v. 86-7,

Cui nomen vox prima meum ludusque tenello

Risus, et e nostro veniebant gaudia voltu ;

risus. *sc.*, noster.

Cui, in *Ecl.*, iv. 62, appears a Vergilian variation of Catullus' *ad patrem*.

The steps in the syntax appear to be

- | | |
|-----------------------|-------------------------|
| 1. Ridere aliquem, | |
| 2. ridere ad aliquem, | (Catul., <i>l. c.</i>) |
| 3. arridere alicui, | |
| 4. ridere alicui. | (Verg. <i>l. c.</i>) |

Georg. ii. 32.

Et saepe alterius ramos impune videmus

Vertere in alterius, mutataque insita mala

Ferre pirum, et prunis lapidosa rubescere corna.

The words *alterius* show that neither tree is superior to

its substitute : the pear-tree bears apples, and the apple-tree bears pears.

An ordinary writer would make the engrafted tree the subject of *rubescere*, as *pirum* is the subject of *ferre*. But it is Vergil's way, like Tacitus, *proprie communia dicere*, to vary common forms, and so he makes the graft the subject.

The passage Georg., ii. 426, quoted to show that *poma* is the tree, merely shows it to be the fruit-bearing part of the tree as opposed to the trunk :—

Poma quoque ut primum truncos sensere valentes.

Cf. Ov., *Met.* viii. 408,

torsit grave cuspidē cornū,

i. e., the branch. *Corna* = the berries were bright-red; whereas *pruna* were of various colours—white and red (*i. e.* bluish-red), Plin., xv. 12, 1, but not scarlet; while, if we engrafted the cornel-tree with the plum, we should have the tree whose fruit is essentially red growing red with a fruit which may not be red at all.

Prunes were not known as fruit in Cato's time, Plin., xxxv. 13. Columella mentions both as preserves, xii. 10, which favours my view of *alterius*.

Conington's difficulty that in *Aen.*, iii. 650,

dant rami bacas lapidosaque corna,

corna are poor fare, only means that no one likes to live on fruit from the tree.

The miser in Horace eats *corna* (*Sat.* II., ii. 57); while *pruna* are sent as presents—*addam cerea pruna* (*Ecl.* ii. 53), as the epithet shows, on account of their appearance as well as flavour.

As far as Latin is concerned, the position of *prunis* is in favour of its being the Vergilian locative rather than

the instrumental ablative which generally is after the verb; and *lpidosa* is certainly an attribute of fruit and not of trees.

If *prunis* were the instrument, why did not Vergil write

cornu et lapidosa rubescere prunis?

The sense then is: we see on prune-trees cornel-fruit, and, by parity of reasoning, prune-fruit on cornel-trees.

Georg. ii. 59.

Pomaque degenerant succos oblita priores.

Succos is accusative on *degenerant*; *cf.* *Ov.*, *Met.* vii. 543, *degenerat palmas*; *ib.*, *Pont.* iii., i. 45. *Hanc cave degeneres*; *Propert.*, iv. i. 81, *degenerasse propinquos*.

The participle *oblitus* elsewhere in Vergil takes the genitive; though the verb, in the only passage in which it occurs, takes the accusative: *obliviscere Graios*, *Aen.*, ii. 148.

Aen. v. 119.

Urbis opus.

Explained by

Urbis opus domus una fuit, spatiumque tenebat

Quo brevius muris oppida multa tenent

(*Ov. Fast.* vi. 641-2)

and by

Magnae molis opus. (*Sil. Ital.* iii. 582)

In each case the genitive is adjectival; *cf.*

Montis onus (*Stat. Theb.* vi. 86)

= 'a mountain-sized load'; *regis opus* (*Hor. Epist.* ii. iii. 65) = a work on the scale of an Eastern sultan, not of the First Citizen of the Republic; *pacis opus* (*Stat. Theb.* iv.

552) = a work for peace, not for war. Cf. *littus amoeni secessus* (Juv. iii. 4); *sacri fontis nemus* (ib. 13); *extinctae corpus non utile dextrae* (ib. 48); *lumina fastus*, i. e. 'proud looks' (Prop. I. i. 3); *lympharum in speculo*, i. e. 'watery mirror' (Phaedr. I. iv. 3); *tanti majestas ducis*, imperial majesty (ib. II. v. 23); *luxuriae domum*, i. e. domum luxuriosam (ib. IV. v. 44); *tempora veris*, i. e. tempora verna (Ov. Fast. i. 496); *Carthago fraudum domus* (Sil. It. vi. 479).

Aen. vii. 83-84.

lucosque sub alta

Consulit Albunea, nemorum quae maxima sacro

Fonte sonat saevamque exhalat opaca mephitim.

Albunea, the Sybil, had a grove at Tibur and a sulphur-spring, the source of the Albula. If so, Vergil may have extended the name Albunea to the falls, of which the other waters would appear a continuation. Cf. Sil. Ital. i. 666 :

fontes et stagna Numici,

with ib. viii. 360 :

fonte Numici ;

and

Cimini cum monte lacum. (*Aen.* vii. 697)

The principle appears to be that geographical adjectives with variations of gender denote district, lake, or mountain. The parallels

nemorum quae maxuma, (*Georg.* ii. 15)

and

Baiarum maxuma silvis, (*Tib.* III. v. 3)

are perhaps imitations of the Greek geographical genitive. *Fons* is not of necessity a jet d'eau, but any spring or affluent. The word *Albunea* would thus include—

1. the wood under the falls ;
2. the falls flowing into the sulphureous water ; and
3. the sulphureous water itself.

The noise of the falls would thus seem an attribute of the water into which they run.

Aen. vii. 211.

Numerum divorum altaribus addit.

Numerus is sum, and *numeri* are its items. If, then, we read addit, numerum must be taken either in the sense of quantity, $\pi\lambda\eta\theta o\varsigma$, or in the sense of an item, which is denied by Conington. It is so used in Statius :

Aut nece facta luet numeroque explebit adempta
Corpora. (Theb. xii. 102.)

Aen. vii. 598-9.

Nam mihi parta quies, omnisque in limine portus.
Funere felici spoliior.

The general sense is : I have lived my life : facilis jac-tura sepulchri (ii. 646).

Parta is won, secured : pacemque et victoriam vobis peperit, Scip. Afr. Or. (R. Meyer, p. 7). If *in limine* is a metaphor so hackneyed as to have lost the sharpness of its primary significance, and thus *portus* may be pressed, we may render : 'there is but a step to the haven of repose which is at my door.' As to *limen*, it is properly applied to the line of demarcation between the home life and the world (Justin. *Instit.* I. xii.); and so metaphorically to other lines of demarcation :

leti jam limine ab ipso ; (Lucr. ii. 959)
vitae cum limen inimus. (ib. iii. 681)
cur indecores in limine primo
Deficimus, (Aen. xi. 423)

is of course metaphorical.

In Tac. *Ann.* xi. 27, I think *limen* has dropped out before *subisse*: atque illam audisse auspicum verba, *subisse*, sacrificasse apud deos: *i. e.* Messalina went up to the threshold like a bride. For *subire*, cf. Catul. lxi. 168:

Rasilemque subi forem.

Portus, too, is a word which has grown blunted in use. There is as great a mixture of metaphor in

Si est erratum, redeamus in viam. Optimus est portus paenitentis mutatio consilii. (Cic. *Phil.* xii. 3. 7.)

Aen. viii. 22.

Sicut aquae tremulum labris ubi lumen aenis
Sole repperctum aut radiantis imagine lunae.

i. e. sun-light or moon-light reflected from the water; *sole* and *imagine lunae* are ablative of cause, *by the action of the sun or moon*: *imago* is visible shape or phase of the real moon, not its reflection in the water; cf. Ov. *Met.* xv. 785:

Solis quoque tristis imago;

Lucan, v. 446:

Pontus non solis imagine vibrat.

Imago as reality is opposed to untrue representation:

Ista repperctissae, quam cernis, imaginis umbra est;
(Ov. *Met.* iii. 434)

so *simulacra* of the phases of the real moon:

lunae simulacra feruntur.

(Q. Cicero de xii. Sig., 16.)

Aen. viii. 296-7.

Janitor Orci

Ossa super recubans antro semiesia cruento.

Cf.

sparsa solo turbaverat ossa

Sc. Cerberus.

(*Stat. Th.* ii. 29)

The germ of the notion is in Hesiod, who calls Cerberus

ἑμμηστῆς.

(*Th.* 311, 377)

The materialism of the passage in Vergil is common to the Roman poets :

lateri vestis adusta fuit

Et solitam digito beryllon adederat ignis

Summaque Lethaeus triverat ora liquor.

(*Prop.* iv. vii. 8-10)

Humana effodiens ossa thesaurum Canis

Moverat, et violarat quia manes deos.

(*Phaedr.* i. xxvii. 3-4)

Quo non Romanos violabis vomere manes.

(*Luc.* vii. 852)

Tu nostros Aegypte tenes in pulvere manes.

(*ib.* viii. 834)

Caros urna confundite manes.

(*Stat. Th.* iii. 168)

manibus aethera purum

commaculet.

(*ib.* viii. 754)

Permiscetque vagos in sanguine manes.

(*ib.* x. 276)

Aen. ix., 478.

muros amens atque agmina cursu

prima petit.

Agmina is certainly *men in motion*: here, perhaps, the parties *hastening* to man the walls.

Aen. ix. 486.

nec te tua funera, nate,

Produxi.

Funera is certainly applied to one person :—

Optavit genitor primaevi funera nati.

(*Catul.* lxiv. 402)

Sed sine funeribus caput hoc sine honore sepulcri

Indeploratum barbara terra tegit.

(*Ov. Tr.* III. iii. 45-6)

Tibia funeribus convenit ista meis. (*ib.* v. i. 48)

flentem mea funera vidi. (*Ex Pont.* I. ix. 17)

taedaeque ad funera versae. (*Sil. It.* ii. 184)

nostrosque in funera Poeni

Aeneadas undis totoque eguisse profundo.

(*ib.* xvii. 289-90)

Pentheos in triplices funera rapta greges.

(*Prop.* iv. xvii. 24.)

Aen. xi. 562.

Sonuere undae ;

i.e. the air near the surface of the water, and so the water.

Cf. *ib.* 863 :

teli stridorem aurasque sonantes ;

Sil. Ital., xvii. 487-8 :

Contremuere auras rapido vibrantibus hastis

Turbine ;

Lucan. ix. 827 :

Scythicae strideret arundinis aer.

The perfect in the midst of a group of present tenses describes something so rapid that it is over while the seve-

ral actions described by the present are running on. Cf.
Georg. i. 330, *fugere ferae*; *Aen.* xii. 283, *diripuerunt aras*.

cessere magistri. (G. iii. 549)

tecta metu petiere. (A. iv. 164)

lora

concussere jugis. (A. v. 146)

sonuere lyrae, sonuere pharetrae. (Ov. R. A. 705)

confremuere omnes. (ib. M. i. 199)

fugere lupi, fugere revulsis

unguibus impastae volucres. (Luc. vi. 627-8)

consumsere locum. (ib. vii. 461)

deseruere canes. (ib. viii. 829)

dissiluere fores. (St. Theb. vii. 69)

cessere fugatae

Nereides. (viii. 361-2)

rapuerunt licia Parcae. (ib. 382)

excludere diem telis. (ib. 412)

secessere trabes. (ib. xii. 436)

Aen. xi. 644.

Tantus in arma patet.

Cf. Statius, *Theb.* ix. 428:

omnisque patet leto.

MISCELLANEA.

LUCILIUS.

Occidam illum equidem et vincam, si id quaeritis, inquit.

Verum illud credo fore: in os prius accipiam ipse,

Quam gladium in stomacho *suria* ac pulmonibus sisto.

(Ap. CIC. *Tusc.* iv. 48)

Bentley reads *furiae*: if this were the dativus commodi, or even the possessive, it ought to have been in another place, and there is nothing in the metre to prevent it: read *rusum* = *ursum* = I will take his thrust before I return the compliment in his throat and lungs. Killing the gladiator was a regular piece of butchery, as may be seen in the bas-relief from the tomb of Scaurus. The victor is working his sword into the throat, *stomacho*.

Odyssey, E. 287.

πολλὴν δ' ἐπιχεύατο ὕλην.

This is one of the many less opportune insertions in the *Odyssey* which prove the priority as well as the superiority of the *Iliad*.

We have

πολλὸς δ' ἐπελήλατο χαλκός (N. 800)

where πολλός is proved to be part of the predicate by

ἐπὶ δ' ὄγδοον ἤλασε χαλκόν. (H. 223)

Here Ulysses makes a bulwark of wattlework. This would do two things in a heavy sea—break the weight of the water, and let it run off; so

πολλὴν δ' ἐπιχεύατο ὕλην

is, he laid on wood thick ; *i.e.* he placed on the open wattle-work a solid top-rail.

To make it ballast, with Mr. Butcher, is injudicious : wood is the worst ballast ; and ballast is not kept on deck ; and wooden ballast on deck is the worst ballast in the worst place.

εὐδαιμονία and BEATA VITA.

Cicero's attack on the Stoic dogma, *ὅτι αὐτάρκης ἡ ἀρετὴ πρὸς εὐδαιμονίαν*, in Par. ii., Tusc. v., and in de Finibus, iv. and v., is an *ignoratio elenchi*. The Stoics, like Theologians, pressed popular etymology into their service ; *εὐδαιμονία* is the proper state *κατὰ τὴν συμφωνίαν τοῦ παρ' ἐκάστῳ δαίμονος πρὸς τὴν τοῦ τῶν ὅλων διοικήτου βούλησιν*, Diog. Laer. vii. i. 88. That this is no metaphor is clearly seen in Marcus Antoninus. *Inter alia, εἰ δὲ μηδὲν κρεῖττον φαίνεται αὐτοῦ τοῦ ἐνιδρυμένου ἐν σοὶ δαίμονος, τὰς τε ἰδίας ὁρμὰς ὑποταχότος ἑαυτῷ, καὶ τὰς φαντασίας ἐξετάζοντος, καὶ τῶν αἰσθητικῶν πείσεων, ὡς ὁ Σωκράτης ἔλεγεν, ἑαυτὸν ἀφειλκυκότος, καὶ τοῖς θεοῖς ὑποταχότος ἑαυτὸν καὶ τῶν ἀνθρώπων προκηδομένου*, iii. 6. The *δαίμων* is constantly referred to, and seems to have had its origin in the Socratic *τὸ δαιμόνιον*. Cicero's summing up *possitne quis beatus esse quamdiu torqueatur* refers to *αἰσθητικαὶ πείσεις*, not to the faculty which subordinates them. The very word *beatus* is misleading. *Mae-cenas* is *beatus*, as he has every kind of expensive comfort. Was he *εὐδαίμων*? He answers for himself :

*Vita dum superest, bene est !
Hanc mihi vel acuta
Si sedeam cruce, sustine.*

TACITUS, *Agricola*, 24.

Nave prima,

the first ship in these waters.

This rendering has been objected to, on what grounds is hard to see. It is paralleled by

merces prima digna carina ; (Seneca, *Med.* 365)

prima dignum statuere carina, (Val. F. v. 473)

both of the Argo, the first ship in any waters.

LUCRETIVS, iv. 216.

Aetheris ex oris in terrarum accidat oras.

Here oris and oras must be read, and this necessitates oras in Vergil's luminis oras, where the variant auras is found in each instance. Ora = orsa, is the border.

The use of QUAMQUAM and QUAMVIS in the 'Annals' of Tacitus.

In reading the *Annals*—the most mature work of Tacitus—I marked each of these particles wherever I observed it. I cannot affirm that none were overlooked; but the induction is sufficient to support the following generalizations:

I.—QUAMQUAM is used with either the indicative or the subjunctive:

- A. With the indicative, and with adjectives and participles, it is objective or matter of fact in the highest degree: *e. g.* Piso quamquam coepta secus cadebant, in the teeth of what everybody knew, that his attempts were failures.

B. With the subjunctive *quamquam* is used—

1. With a verbal quotation which in direct narrative would have been the indicative: *e.g.* *multaque indicia saevitiae, quamquam premantur, erumpere*, I. 4.

2. Of matters of fact, which the subject of the sentence regards as objective: *e.g.* *Germanicum—adsciri per adoptionem a Tiberio jussit, quamquam esset in domo Tiberii filius juvenis*; *i.e.* Augustus commanded, although he was fully aware that Tiberius had a son alive and unemancipated, I. 3.

II.—*QUAMVIS* is always purely subjective, like the index *n*, pushing the notion as far as you please: *quamvis firmatus animo centurio, i.e.* it took all the disciplined will of the old soldier, I. 6.

ARISTOTLE, *Eth.* N. vii. 8.

ὁ μὲν τὰς ὑπερβολὰς διώκων τῶν ἡδεῶν· ἥ καθ' ὑπερβολὰς ἢ διὰ προαίρεσιν, δι' αὐτὰς καὶ μηδὲν δι' ἕτερον ἀποβαῖνον ἀκόλαστος· ἀνάγκη γὰρ τοῦτον μὴ εἶναι μεταμελητικόν, ὥστ' ἀνίατος· ὁ γὰρ ἀμεταμέλητος ἀνίατος.

Mr. Bywater, in the *Journal of Philology*, 4. 218, proposes to read καθ' ὃ ὑπερβολαί in place of καθ' ὑπερβολάς. No change is necessary. καθ' ὑπερβολάς is merely the plural of καθ' ὑπερβολήν, which refers to the various kinds of sensual pleasure, and is an abbreviation of the fuller formula, τὰς ὑπερβολὰς καθ' ἃς ὁ ἀκόλαστος ἀκόλαστος, 7. 12. 7.

T. MAGUIRE.

PINDARICA.

THERE are three places in Pindar where the optative is supposed to be used without *ἀν*, though there is a condition (expressed or implied), and though the *potential* sense of the optative (which can dispense with *ἀν*) is plainly inapplicable. I am glad to find that Professor Gildersleeve, in his excellent edition of the Olympian and Pythian odes, which has just appeared (Macmillan), explains these passages in the way in which I have been in the habit of explaining them in lecturing on Pindar.

1. The first is Ol. III. 45 :

οὐ μιν διώξω· κεινὸς εἶην.

Fennell translates 'I should be foolish (if I were to do so, but I certainly shall not).' Myers, 'The quest were vain.' Others change the text. But the meaning is strictly optative: 'May I be baffled (if I go on such a quest).' That is, 'set me down as a fool (if I do).' Gildersleeve excellently compares Lys. 21. 21, *μαινοίμην εἰ ἀναλίσκοιμι*, 'set me down as a madman if.'

2. Pyth. IV. 118 :

οὐ ξείναν ἱκοίμαν γαῖαν ἄλλων.

Here, too, the sense is strictly optative; *οὐ ξείναν* = *φίλιαν*, and the meaning is, 'may I have come to a friendly land.'

3. Pyth. X. 21 :

θεὸς εἶη
ἀπήμων κέαρ.

The meaning is just the same as in Ol. III. 45: 'Set him down as a god who has no cares.' I do not think this use of the optative, *μαινοίμην* = *δοκοίην μαίνεσθαι*, is noticed in the grammars.

NEM. 9. 23.

A very difficult expression here is robustly explained by Mezger:

Ἴσμηνοῦ δ' ἐπ' ὄχθαισι γλυκὺν
νόστον ἐρυσσάμενοι λευκάνθεα σώματ' ἐπίαναν καπνόν.

The word ἐρυσσάμενοι has puzzled the commentators. It has given rise to a host of conjectures, and is given up by Bergk, who writes *ego nequeo expedire*. Mezger takes ἐρυσσάμενοι in its most natural sense, 'dragging to oneself,' the sense which the word bears in *Il.* 18. 174:

οἱ δὲ ἐρύσασθαι ποτὶ Ἴλιον ἠνεμόεσαν.

The figure present to Pindar's mind was a sort of *tug of war*. The Argives, 'in their struggle for (victory and) safe return,' fed the pyre's smoky flame. 'In the tug for home' would be a good rendering.

The following considerations strongly confirm Mezger's explanation. Pindar very probably had in his mind a recollection of the Homeric *πείραρ ἐπαλλάξαντες*. It is quite in his manner to reset, as it were, the jewels of epic verse, by making phrases which recal, and do not merely repeat, the traditional epic tags which recur so often in Homer. Thus *μενοίκεα δαῖτα* reappears as *ἀρμόδιον δείπνον* (Nem. 1. 21); and *θαλίη ἐνὶ πολλῇ* was perhaps in his mind when he wrote *ἐν ἀρμένιοισι πάντα θυμὸν αὔξων* (Nem. 3. 58). This view furnishes a reason for holding that *ἀγλαόκαρος*, applied to Thetis in Nem. 3. 56, means 'mother of noble offspring,' a resetting of the Homeric *(δυσ)αριστοτόκεια*. A similar echo is found in *θάλλοντος συμποσίου*, compared with *δαῖτα θαλαῖαν*. The phrase *νόστον ἐρυσσάμενοι* = *περὶ νόστου ἀγωνισάμενοι* is not a more violent metaphor than *συλαθείς ἀγενέων* = *ἔξελθὼν ἐφήβων* (Ol. 9. 95), or *εὐφροσύνας ἀλάται* = *εὐφροσύνης ἀπεστέρηται* (Ol. 1. 58).

ISTHM. 3. 54.

ἴστε μὰν Αἴαντος ἀλκὰν φοῖνιον, τὰν ὀψία
ἐν νυκτὶ ταμῶν περὶ ᾧ φασγάνῳ μομφὰν ἔχει παίδεσσιν Ἑλλάνων
ὅσοι Τρῳάνδ' ἔβαν.

Here surely ταμῶν is wrong. It is hard to say what ταμῶν περὶ ᾧ φασγάνῳ could mean. Certainly not περιταμών ᾧ φασγάνῳ. Possibly the poet wrote not ταμῶν, but πραθῶν (Pyth. 9. 81), or βαλῶν, or δικῶν. The words βαλῶν (or δικῶν) περὶ ᾧ φασγάνῳ would mean the same as φασγάνῳ ἀμφικυλίσαις (Nem. 8. 23).

ISTHM. 5. 35.

I would here suggest another correction of the text :

ἀλλ' Αἰακίδα καλέων
εἰς πλόον κύρησε πάντων δαινυμένων.

But πάντων has no MS. authority. Bergk reads :

εἰς πλόον . . κύρησεν δαινυμένων.

Now the note of the scholiast is ἀλλὰ τὸν Αἰακοῦ παῖδα τὸν Τελαμῶνα εἰς τοῦτον τὸν πλοῦν καὶ ταύτην τὴν συμμαχίαν καλῶν ἔτυχεν ἀνευρῶν εὐωχούμενον τὸν Τελαμῶνα (Abel, p. 45). Thus the scholiast plainly found δαινύμενον, not δαινυμένων, and the lost word is a participle depending on κύρησε. I would suggest :

εἰς πλόον, κύρησε τέτμων δαινύμενον.

The verb τέτμειν is the regular epic word for 'to find' (at home or not at home). Moreover, κύρησε, coming from κυρέω, not κύρω, must be auxiliary. If Pindar had wished to say 'fell in with,' he would have used ἔκυρσε with gen., or ἐπέτοσσε with dat. He never uses any part of κυρέω as 'to meet with.' Nor indeed is there any passage in early Greek which defends this meaning. In Hesiod, *Op.* 755, κυρήσας = τυχών, as is shown by the note of Proclus. This again illustrates the marked proneness of Pindar to use *epical* terms. Christ and Mommsen read δαινύμενον in their texts.

R. Y. TYRRELL.

TULLIANA.

I BEGIN by defending more fully my conjecture, *pipulo convicio* for *populi convicio*, put forward in the last HERMATHENA, p. 24.

Q. FR. II. 10 (12). 1.

Gaudeo tibi iucundas esse meas litteras, nec tamen habuissem scribendi nunc quidem ullum argumentum, nisi tuas accepissem. Nam pridie Id. cum Appius senatum infrequentem coëgisset, tantum fuit frigus, ut PIPULO CONVICIO coactus sit nos dimittere.

nam]. Cicero has no news to tell Quintus, because the meeting of the senate ended abruptly.

pipulo, convicio]. 'noisy clamour,' i. e. of the senators. The MS. reading is *populi convicio*. Boot (*Obs. critt. ad M. T. Ciceronis Epistolas; Amstelodami*, 1880) justly observes that he does not understand how the consul was forced by the clamour of the people outside to dismiss the senate. He would read *communi convicio*; but my conjecture is far less rash: *pipulo* is a Plautine word, and therefore very likely to be used by Cicero; it would almost certainly be mistaken by the scribe for *populo*, which he would naturally change to *populi*, to obtain a construction. *Asyndeton* is quite a characteristic feature in the letters of Cicero, especially asyndeton between two words. For two words with asyndeton, cp. *patrimonio fortuna*, Att. XI. 9. 3; *causae meae voluntati meorum*, Att. III. 13. 1; *querentibus postulantibus*, Att. V. 21. 12; *adsunt queruntur*, Div. in Caec. 11; *expulerit relegarit*, Sest. 29; *officiis liberalitate*, Fam. XIII. 24. 3; *vultu taciturnitate*, Fam. III. 8. 2; *gratisimo iucundissimo*, Fam. XIII. 28. 3; *studiis beneficiis*, Fam. VII. 5. 1. We read in Q. Fr. II. 1, that the hired roughs of

Clodius a Graecostasi et gradibus clamorem satis magnum sustulerunt, and that the consequence was the breaking up of the meeting of the senate. But in that case they were hired by Clodius to do what they did. How could the coldness of the weather bring the people outside to break up the meeting of the senate 'with abuse,' *convicio*? But it is quite credible that the senators themselves should have shouted down every attempt to put a question to the house with abusive clamour, calling on the consul to dismiss the house. Each senator wished to go away on account of the cold (which word, as we shall see, is also susceptible of another meaning), but did not wish to leave behind him a house to pass measures unacceptable to him. With this passage must be discussed the words at the end of the letter: *ut summum periculum esset ne Appio suae aedes urerentur*. The passage runs thus:

IBID. *fin.*

Litterae quidem ad id, quod exspectas, fere cum tuo reditu iungentur, reliqua singulorum dierum scribemus ad te, si modo tabellarios tu praebebis. Quamquam eius modi frigus impendebat, ut summum periculum esset ne Appio suae aedes urerentur.

Here again Boot asks, What is the meaning? It is true that in seasons of great cold there is a greater danger of conflagrations, because larger fires are kept. But why should the consul's house be in more peril than houses of other people? Manutius explains by observing that in the house of the consul, which was frequented by crowds of visitors, and by those who would escort him home from the senate, a very large fire would naturally be kept. But such an explanation is manifestly puerile.

This being so, I am disposed to explain the two passages—the one in the beginning of the letter and the one at the end—as jocular, or at least covert allusions to the

lack of interest in public affairs, the inactivity and apathy of the senate, and the dulness of the business before them. The first passage would then mean: 'Appius could only get together a small meeting of the senate, and when it did meet, such was *the utter dearth of interest*, that it ended in noisy clamour for a dismissal of the house.' The sentence at the end would mean: 'The barometer of public feeling is so near freezing point that Appius' house runs a great risk of being *frost-bitten*,' that is, utterly deserted by *salutatores* and *deductores*. For examples of *frigus* in the metaphorical sense of 'dulness, apathy, stagnation,' cp. *si Parthi vos nihil calfaciunt nos hic frigore rigescimus*, Fam. VIII. 6. 4; *Curioni tribunatus congelat*, ib. 3; and the synonymous phrase, *ib. 4, veternus civitatem occupasset*; so also *metuo ne frigeas in hibernis* ('have nothing to do') . . . *quamquam vos istic satis calere* ('are kept pretty busy') *audio*, Fam. VII. 10. 2; cp. also Ov. *Fast.* II. 856, *virque tuo Tereus frigore laetus erit*.

Uri = 'to be frost-bitten,' is common enough; Cicero uses it in this sense in one passage, where it is as susceptible of misapprehension as it is here, *pernoctant venatores in nive, in montibus uri se patiuntur*, Tusc. II. 40.

This explanation, moreover, gives a far more appropriate meaning to *quamquam* in the sentence at the end of the letter: 'I shall give you the news of every day. Yet [there is really nothing to tell, for] the barometer of public interest is so near freezing point that Appius' house seems likely to be frost-bitten.' It is to be observed that, both at the beginning and the end of the letter, the mention of *frigus* is introduced to account for the dearth of news.

Frigus might also be used in the metaphorical sense of *disfavour* (towards Appius): cp. *maiorum nequis amicus Frigore te feriat*, Hor. *Sat.* II. 1. 62; *limina frigescant*, Pers. I. 108; to which the Dictt. add several examples in Quintilian and Pliny. But this use of *frigus* would not

account for *quamquam*, and is not so characteristic of the tone of Cicero's letters.

Fam. VII. 10. 2.

Valde metuo ne frigeas in hibernis : quam ob rem camino luculento utendum censeo : idem Mucio et Manilio placebat, praesertim qui sagis non abundares.

frigeas]. It seems probable that *frigeas* is here used in its metaphorical sense of 'having nothing to do.' Cicero then passes to the literal meaning of *frigeas*, and says, 'you ought to keep your hearth blazing.' *Calere* is certainly metaphorical : 'though you are so frozen out in your winter quarters, yet I hear you have hot work over there' (alluding to the Gallic rising under Ambiorix, Caes. B. G. V. 26).

abundares]. This word must depend on the clause *idem . . . placebat*, else the present tense must have been used ; hence I have slightly changed the usual punctuation which makes *idem . . . placebat* parenthetical. The meaning is : 'this was the *counsel's opinion* of those celebrated jurists, Mucius and Manilius, especially for one who, like you, has not a sufficient campaigning kit.' The only trace of humour is the appealing to the *responsa prudentium* to confirm such a very obvious truth, that if you are cold you ought to keep a good fire. Probably Trebatius did not provide himself largely with military equipments, not intending really to take part in the campaign : we read above (*Fam.* VIII. 1) that he refused the post of *tribunus militum*. The regular phrase for 'taking the field' was *saga sumere*. Perhaps Cicero wished to hint that Trebatius was not very eager for this. But we must not look for too much point in jests which were dictated, perhaps, by a momentary access of high spirits, and which were not intended for anyone but his correspondent. Cicero himself says : *multa ioca solent esse in epistolis quae prolata si sint inepta esse*

videantur, Phil. II. 7. It appears from Att. v. 5. 1, that Cicero, regarding joking as one of the ordinary ingredients of a letter, *plane deest quod scribam: nam nec quod mandem habeo . . . nec quod narrem . . . nec iocandi locus est, ita multa me sollicitant.*

Fam. VII. 16. 1.

In Equo Troiano scis esse: *in extremo sero sapiunt*. Tu tamen, mi vetule, non sero. Primas illas rabiosulas sat fatuas dedisti: deinde . . . Quod in Britannia non nimis φιλοθέωρον te praebuisti, plane non reprehendo: nunc vero in hibernis intectus mihi videris: itaque te commovere non curas.

Usque quaque sapere oportet: id erit telum acerrimum.

Equo Troiano]. A play of this name is ascribed both to Livius and to Naevius.

in extremo]. The passage is usually given thus: in Equo Troiano scis esse in extremo: *sero sapiunt*; and the proverb is supposed to be *sero sapiunt*, because Festus says: *sero sapiunt Phryges proverbium est natum a Troianis qui decimo denique anno velle coeperunt Helenam quaeque cum ea erant rapta reddere*. But according to Festus *sero sapiunt Phryges* is the proverb, and he says nothing about its being a quotation from a play. Here we have expressly a quotation from a play. I believe the words quoted from this play to be, *in extremo sero sapiunt*, referring possibly to the Phrygians, but possibly having a general application. The words mean, ‘when a man comes to extremities it is too late to show the discretion which might have saved him.’ The passage, as I have said, is usually printed: In Equo Troiano scis esse in extremo: *sero sapiunt*. But why should Cicero mention *the part of the play* at which the words occur? And is not *in Equo Troiano in extremo* a vile phrase? Besides, *sero sapiunt* can hardly be called a sentiment at all, while *in extremo sero sapiunt* is a good proverb. For the words require some further qualifica-

tion: they should give some class of men who are 'wise too late' (e. g. *Phryges*), or some circumstances under which it is too late to be sensible. The proverb, as I understand it, fulfils the last condition, and says that '*when things have come to an extremity* it is too late to be wise.' I need not point out that the words, as I have given them,

in extremo sēro sapiunt,

form the beginning of a good iambic verse according to old Latin prosody and scansion.

mi vetule]. This address is merely playful. He calls Trebatius 'my old fellow' because he is cautious—has an old head on young shoulders. He congratulates Trebatius on being wise in time, and seeing the folly of the spirit reflected in his earlier letters—a spirit of impatience and discontent, and foolish yearning for Rome.

primas]. 'Your earlier letters breathed a tragic rage that was silly enough—but then'—you know the rest—you know how you changed your tone.

in Britannia]. 'In the matter of going to Britain.'

non nimis φιλοθέωρον]. 'Not too great a gadabout.'

intectus]. It appears from the next letter that there was an insufficient supply of the *sagum* or military cloak, which was also used as a blanket. Cicero alludes to this fact, and says, 'therefore, naturally, you don't care to stir abroad.' Then he quotes a verse from some poet which seems to have little point, except in so far as there is a kind of play on *sapere*, 'to be a man of sense,' which meaning it seems to bear in the quotation, and *sapere*, as applied especially to jurisconsults, *sapiens* having been the *sobriquet* of Curius, Fabricius, Coruncanius, &c. (Lael. 18). So in the next letter he congratulates Trebatius on being in a country where he might seem *aliquid sapere*, that is, where (in the absence of rivalry) he would be at the very top of his profession. But all this is very far-

fetched. And it must be remembered that *iniectus*, not *intectus*, is the MS. reading. This would not be of very great importance were it not that *inicere*, as well as *iniectio*, has a juridical sense, 'to seize on as one's property without a judicial decision,' as in the case of a runaway slave. If *iniectus* could possibly mean 'subjected to this process,' we should have a characteristically playful use of a juridical term, 'under arrest'; *inicere manum* takes an accusative of the person arrested; but I will not go so far as to say that this would justify *iniectus*, 'arrested.' *Iniectus* certainly does not bear its ordinary meaning here: it is either a juridical term, or it is unsound, and *intectus* must be read.

Fam. VII. 1. 1.

. . . ex illo cubiculo ex quo tibi Stabianum perforasti et patefecisti Misenum.

ex quo tibi † Stabianum † perforasti]. I think *Stabianum* is certainly corrupt. *Perforasti Stabianum* is usually explained, 'you have opened a window giving on the Stabian waters of the Bay.' But is this a possible meaning of the verb? *Perforare* means—(1) 'to bore through,' a meaning which is clearly impossible here; (2) 'to make by boring'; and this last signification is common in Cicero: e. g. *duo lumina ab animo ad oculos perforata*, N. D. III. 9; *viae . . . a sede animi perforatae*, Tusc. I. 46. But *perforare Stabianum* = *perforando patefacere Stabianum* is impossible, as was seen by Boot (*Obs. Crit.* p. 12). Under *Stabianum* lurks some direct object of *perforasti*. Boot conjectures *tablinum*, 'a balcony.' I would suggest, as nearer to *stabianum* of the MS., *istud maenianum*. For *maeniana*, 'timber balconies' thrown out, for the purpose of affording a view, and taking their name from Maenius (cons. 416, b. c. 338), see Reid on Acad. II. 70. Either conjecture involves a violent departure from the MS.; but a puzzled copyist would be

very likely to suppose a reference to *Stabiae* S. of Pompeii, where the villa of Marius was situated. Boot would read *sinum* for *Misenum*, but on insufficient grounds. The whole sentence *ex quo maenianum perforasti et patefecisti Misenum* for *ex quo maeniano perforato patefecisti Misenum* supplies an example of *parataxis* for *hypotaxis* not rare in the letters.

R. Y. TYRRELL.

THE BUCOLICS OF CALPURNIUS AND NEMESIANUS.¹

TEUFFEL says that the Romans were too well acquainted with country life to idealise it, and that therefore the Idyl was in little favour among them.

It is more likely that the conventional and allegorical treatment adopted in this kind of poetry contained in itself the seeds of decay, and was especially unsuited to the matter-of-fact Roman. Byron's words, 'Arcadia displays but a region of dreams,' sufficiently explain why the realistic Romans were more forward to honour Thalia when she wore the comic mask than when she appeared with the shepherd's staff and the ivy wreaths,² and we feel little surprise that Theocritus, who found but two disciples of his own tongue, can boast but few well-known names among his imitators in Italy.

Valerius Cato, the gentle-spirited contemporary of the *plagosus Orbilius*, wrote a poem entitled *Dirae*,³ in 183 hexa-

¹ This Paper is based on materials collected for a proposed edition of the *Bucolics* of Calpurnius Siculus and Nemesianus.

My principal obligations are to Wernsdorf, Glaeser, Conington, Teuffel, and, above all, to Haupt. The exhaustive essay of the last-named scholar is the chief authority for the date of Calpurnius, and has left little for subsequent writers to add on the subject. My large indebtedness to it is again acknowledged in the course of this Paper.

For convenience, the references to the

Eclogues of Calpurnius and Nemesianus are made in Roman numerals, e.g. II. 4 = the fourth line of the second Eclogue.

² For Thalia as patron of Bucolic poetry, cf. Virg. E. 6. 2 :

Prima Syracosio dignata est ludere versu
Nostra nec erubuit silvas habitare Thalia.

³ Some attribute this poem to Virgil; but Wernsdorf says this was probably owing to the similarity of *Maronis Dirae* and *Catonis Dirae*, and to the lament over his lost farm in the eclogues of the better-known poet.

meter lines, the first part of which contains imprecations on his farm, which had been taken from him and assigned, probably, to some of Sulla's veterans, while the latter part laments the loss of his mistress Lydia.

Septimius Serenus (in the third century, A.D.) wrote two works, of which we still have some fragments, viz., *Opuscula Ruralia* and *Falisca*. He is perhaps also the author of the *Moretum*. This work, however, is usually attributed to Virgil, and it is to be observed that Septimius Serenus does not employ hexameters (the metre in which the *Moretum* is written) in his other works.

Severus Sanctus Endelechiuss (end of fourth century, A. D.) wrote an idyl on the rinderpest in asclepiad and glyconic verse, in which a shepherd describes to two of his fellows how he had saved his flock by the sign of the cross :—

Signum, quod perhibent esse Crucis Dei,
Magnis qui colitur solus in urbibus,
Christus, perpetui gloria Numinis,
Cujus filius unicus.
Hoc signum mediis frontibus additum,
Cunctarum pecudum certa salus fuit.

The works, however, which have reached us from the hands of the above poets are of insignificant extent; and of the five remaining writers who may claim our notice, viz., Ausonius, Claudian, Tibullus, Virgil, and Calpurnius, the two former are bucolic in name rather than reality. Claudian's seven idyls on the Phoenix, Hedgehog, Electric Ray-fish, Nile, Magnet, Hot Springs of Aponus (*Bagni d' Albano*), and the two brothers who saved their parents at an eruption of Vesuvius, are merely a series of essays on the subjects indicated by the titles, written in smooth flowing rhythm, but lacking all true idyllic colouring either of subject or manner. The first five of these idyls are in hexameter verse; the last (which

in its treatment reminds us of Ovid's *Fasti*) and the second last, are in elegiacs.

Ausonius has left us twenty so-called idyls, but they are for the most part mere literary curiosities, *e.g.* the *Griphus Ternarii Numeri*, or *jeu* on the number three, the monostichs on the labours of Hercules, the *Technopaegnion*, or series of hexameter verses, all ending with monosyllabic words of meanings related to the several heads under which the verses are arranged, *e.g.* *de Deis*, *de Cibis*, &c.

Two of his idyls, however, are of superior merit: *Rosae*, a pretty poem of fifty lines in elegiac verse; and the *Mosella*, in 483 hexameters, the most famous piece in the collection, interesting because it describes a journey up the Moselle to Treves, and exhibits a warm appreciation of the beauties of nature.

Tibullus, in Teuffel's opinion, possesses the greatest share of the idyllic spirit among the Roman poets; but he need not detain us, as his poems are distinguished by a very broad line from the school of poetry which we are here considering.

It is to Virgil naturally we turn for the Roman pastoral; and it was he who, taking a Greek model, as was usual with the Romans, first reproduced in the language of Italy the idyls of the Sicilian Theocritus.

On the merits of Virgil's *Bucolics*, however, it is unnecessary to expatiate. Neither panegyrist nor apologist can add much to what has been written on that familiar theme. It is to the last of the five names mentioned above that I desire to call attention, viz. Calpurnius Siculus, a poet whose name is perhaps as unfamiliar to most readers as that of any of the authors to whom I have referred, but whose works would have gained for him more notice were not the date commonly assigned to him the time of Carus and his sons, a period long subsequent to that which marks the limits of ordinary classical studies. It is, however,

highly probable that this date is erroneous, and that the carefully elaborated verses of Calpurnius belong to the beginning of Nero's reign.

Previous to Haupt's 'De Carminibus Bucolicis Calpurnii et Nemesiani Liber' much obscurity prevailed as to the name, the date, and the works of Calpurnius.

Haupt's essay, however, brought together in one view most of the evidence necessary for forming a judgment as to the period in which the poet lived, and as to the amount of literary work which should be attributed to him. This evidence it is desirable to review before we proceed to examine his writings themselves.

It seems to be satisfactorily established that the eleven eclogues commonly assigned to Calpurnius are really the work of two different authors, the first seven having been composed by Calpurnius, about the beginning of Nero's reign, and the last four being the work of Nemesianus, about A.D. 253-284.

Haupt's principal reasons for adopting these conclusions are here stated at some length, as his essay is probably not in the hands of many readers, and a knowledge of its contents is absolutely necessary for the student of Calpurnius. His order of arrangement, except where additional comments make a change necessary, is retained, in order to facilitate reference for those who may wish to see the arguments more fully stated in the essay itself.

Haupt points out that Calpurnius shortens final *o* only in agreement with the usage of the strictest poets.⁴ For

⁴ Prof. Maguire in HERMATHENA, vol. v., p. 140, objects that there are no parallels in the Neronian age for II. 32 : *gramine sparget*; and V. 24 : *mittito clausos*. But the readings he quotes, although given in Walker's Corpus and

elsewhere, are probably erroneous.

In the valuable Neapolitan MS. we find *mitte reclusos*, and the vulgate *mittito clausos* is probably a mere conjecture of someone who thought *mitte* and *reclusos* to be tautological, both

putō (VI. 84), and *nesciō* (I. 21), are not alien to classical times.

Ovid A. A. I. 370:

Ut puto, non poteris ipsa referre vicem.

Tibul. I. 5, 75:

Nescio quid furtivus amor parat; utere quaeso.

But in the last four poems, although *horreō* (IX. 43) and *canō* (X. 18 and XI. 41) may be justified by classical usage, we must regard as innovations *expectō* (IX. 26), *conjungō* (X. 14), *concedō* (XI. 42), *ambō* (IX. 17), and perhaps also *mulcendō* (IX. 53), and *laudandō* (IX. 80), although Juvenal, 3, 232, has:

Plurimus hic aeger moritur vigilando: sed illum
Languorem peperit cibus, &c.

In the first seven poems there are but eight elisions, and all in the first foot, or at the outside eleven, if we admit the three doubtful cases, IV. 40, *id.* 134, VII. 77, where the elision is in a foot subsequent to the first. On the other hand we find thirty-nine elisions in the last four poems. In making this calculation it is necessary to correct some of the vulgate readings. In III. 32, for *te o*

expressing the letting of the flocks out of the pens. The whole line runs thus:—

Sed non ante greges in pascua mitte reclusos
Quam fuerit placata Pales.

‘Do not let the flocks out of the pens and turn them into the pasture until, &c.’ In spring the flocks which had been penned up (*claudero*) at the close of the year were let out (*recludere*) and sent to pasture. See V. 103: *cum pecudes extremus clauserit annus*. In II. 96, we have *reclude canalem*, ‘let out the stream.’

The first syllable in *recludo* is common. Virg. A. 7, 617:

More jubebatur tristesque recludere portas.

In II. 32, the Naples and the Paris MSS. read respectively *jungit* and *pingit*; and though Haupt, who himself proposes *cingit*, thinks both MSS. corrupt, yet they render it very probable that *spargit* is not the correct reading, but a mere gloss suggested by IV. 68:

Quem modo cantantem rutilo spargebat
acantho.

Nais, &c.

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Lycida, read *te Lycida*; ib. 7, for *neque enim*, read *nec enim*; ib. 24, omit *es*; ib. 71, omit *et*; ib. 95, for *vicina ut saepe* (adv.), read *vicina sepe* (subst.); IV. 153, omit *in*; ib. 149, for *quae imparibus*, read *quae paribus*; V. 81, omit *et*. To state the reasons for these changes of reading would occupy too much space here, but they will be found in Haupt's work.

I. 20, *descripta est*; II. 19, *ausa est*; VI. 7, *credibile est*, are not properly instances of elision, for *est* coalesces with the preceding word. In V. 104, *est* should be omitted, although *nitendumst* would be admissible, just as *descriptast*, *ausast*, *credibilest*.

After these corrections are made, there remain in the 758 lines of the first seven poems (omitting VI. 54) only the eight following elisions:—

- I. 16: Prome igitur calamos et si qua recondita servas.
- II. 30: Ille etiam parvo dixit mihi non leve carmen.
- III. 12: Mella etiam sine te jurabat amara videri.
- III. 55: Ille ego sum Lycidas quo te cantante solebas.
- III. 58: Atque inter calamos errantia labra petisti.
- III. 77: Saepe etiam leporem decepta matre paventem.
- III. 82: Qui metere occidua ferales nocte lupinos.
- V. 60: Verum ubi declivi jam nona tepescere sole.

It thus appears that IV., VI., VII. are without an elision, that I., II., V. have one each, while III. has no less than five elisions; from which facts Haupt conjectures that III. was written before the other eclogues, and while Calpurnius had not as yet perfected his art. We must also notice that he does not elide a long vowel, and that even a short one is elided only in the first foot, if we except the three cases IV. 40, *ib.* 134, VII. 77, referred to above, in which *que* is elided in a foot subsequent to the first, and which may be explained by supposing either that Calpurnius allowed

himself special license in that one word, or that the readings are erroneous, to which second alternative Haupt inclines.

On the other hand, in the 319 verses of the last four eclogues, we find thirty-nine elisions, one-half of which occur in other feet than the first, and some in a long vowel.

The difference of authorship is also supported by the absence from the earlier poems of such an ending as *montivagus Pan* (x. 17), and by the frequent occurrence of the caesura after the second syllable of a dactyl in the fourth foot (*post quartum trochaeum incisio*) in the earlier poems, which caesura is found only six times in the last four (VIII. 44; IX. 41. 61; X. 55; XI. 11. 14).⁶

Wernsdorf's argument that Calpurnius would probably write eleven eclogues, because that is the number of idyls of a strictly pastoral character which Theocritus has left us, is of little weight; for the second idyl of Theocritus, entitled *Φαρμακείτρια*, which is counted in the eleven, is by no means purely pastoral; and it might as plausibly be alleged on the other hand that seven was the natural number for Calpurnius to compose, since his model, Virgil, has, according to Servius, left only seven eclogues properly rustic.

The resemblances between the third and ninth eclogue do not indicate identity of authorship, but a clumsy imitation, for the graceful similes of the first of these poems are exaggerated, and inappropriately introduced in the latter. It is a touch of nature for Lycidas to say that the charm is gone from everything in the absence of Phyllis; but it is

⁶ This trochaic caesura in the fourth foot, so common in Latin verse, seems to be absolutely excluded from Greek hexameters from the time of Homer

to that of Nonnus. See Professor Tyrrell's interesting article on the Bucolic Caesura, in *HERMATHENA*, vol. viii., page 342.

an absurd conceit to represent the cattle as neglecting their pasture out of regret for the absence of such a character as Donace. The reference to his wealth is made naturally enough in III. by Lycidas; but probability is violated in IX., where Idas, a boy of fifteen, claims to be master of a thousand heifers.

A difference of authorship is also shown by the marked change in the moral tone and in the subject-matter of the last four poems. Donace, of more than doubtful character, takes the place of the virgin Crotale of II., and receives not only the same vows of affection as that embodiment of rustic virtue, but also the same extravagant adulation which the earlier poet paid to the emperor, and which, though not offensive to Roman taste when applied to their deified ruler, is little suited to the playfellow of Idas and Alcon.

The objection which Byron raises to Virgil's second eclogue⁶ holds good against XI., a blot from which the earlier poems are almost free.

While of the earlier poems three at least (I., IV., and VII.) are in glorification of the emperor, there is no allusion to him in the later poems. This fact would harmonize well with the theory of the last four poems having been written in the time of Carus, as that emperor was more devoted to arms than to literature; and Gibbon admits that, even assuming that the earlier poems were written in the time of Carus (which is the opinion of that historian), yet he probably never read the adulation with which he was honoured.

It is strange that Gibbon did not see how strongly this admission tells against his theory that the first seven poems were of the time of Carus, for we can scarcely con-

⁶ But Virgil's songs are pure, except that horrid one
Beginning with *Formosum pastor Corydon*.

ceive them as addressed to any but a warm patron of poetry, and one who was likely to notice and reward the poet's homage.

We see from IV. 19 *sq.* that the emperor under whom Calpurnius wrote was a patron of poetry, while his predecessor had done little to encourage the poet's art. This well accords with Nero's reign, for that emperor was *ad poeticam pronus* (Suet. Nero 52), and loved to collect at supper skilful verse-makers who supplied any deficiencies in his own attempts, but Claudius, his predecessor, was devoted to questions of history and grammar, and doubtless did little to encourage the softer muse.

As a final distinction we may notice that the parenthetical use of *memini* and *faleor* affected in the first seven pieces does not occur in the last four.

The last four poems, then, are by a poet other than Calpurnius, and probably by Nemesianus, for his *Cynegetica* agree with the last four eclogues in the very points in which the said four eclogues differ from the first seven, namely, δ in *exercetio* (194) and *devotio* (83), the number and character of the elisions and the infrequent occurrence of the caesura after the second syllable of a dactyl in the fourth foot. Moreover, *etenim*, which is not very common in the poets, occurs twice in Calpurnius (II., 98 and V. 19), but not in the last four eclogues nor in the *Cynegetica*.

These arguments perhaps only show the possibility of Nemesianus being the author of the poems in question, but its probability is established by the fact that Statius is evidently imitated in both these four eclogues and in the *Cynegetica* (*cf.* X. 23, *sq.*; *Cyneg.* 19; *Stat. Theb.* 7, 167; VIII. 84 *sq.*; *Stat. Theb.* 12, 812, 818), while no imitation of him is to be found in Calpurnius; for, as Haupt shows, Wernsdorf is hardly right in comparing IV. 87 with *Stat.* 5, 1, 11 *sq.* The unusual expression *lactis fluores*,

moreover, is found in Cyneg. 227, and in x. 68 *fluorem lactis* seems to be the true reading. Little weight can be attached to the fact that Vopiscus, in the life of Numerianus, mentions the Halieutica, Cynegetica and Nautica of Nemesianus, but not his eclogues, for he does not profess to be giving a complete list of the works of Nemesianus, but merely mentions the most important of them.

Having thus proved a marked difference in style between the first seven poems and the last four, and shown the probability that the latter are the work of Nemesianus, Haupt in the next place inquires to what poet or poets the eleven poems have been attributed in the past. We find that the first five editions attributed the whole eleven to Calpurnius alone. About the end of the fifteenth century, however, Angelus Ugoletus divided them between Calpurnius and Nemesianus, assigning to the latter the last four. This edition was printed at Parma and has a statement at the end to the effect that it is based on a very old and most correct MS. of Thadaeus Ugoletus, brought from Germany, which presents the following headings over the poems attributed to Calpurnius and Nemesianus, respectively, 'Titi Calphurnii Siculi Bucolicum carmen ad Nemesianum Karthaginensem incipit,' and 'Aurelii Nemesiani Poetae cartaginensis Aegloga prima incipit.' Nor is this the sole MS. authority on which the division rests, for in the Codex Gaddianus (fifteenth century) after the eclogues 'Calphurnii ad Nemesianum Carthag.' we find 'Aureliani Nemesiani Carthag. ecl. III.', and in the codex 'traditionum monasterii Priflingensis,' the 'Bucolica Aureliani' are named, and then, after mention of several other books, come the 'Bucolica Calphurnii.' Finally, in the Neapolitan MS., which is of the highest authority, there is indeed no in-

scription, but we find at the end of the eleventh eclogue the words 'Aureliani Nemesiani Cartag. bucol. explicit. Deo gratias, Amen.'¹

It is probable that the inscriptions to Calpurnius and Nemesianus and the subscription to Calpurnius have been omitted through carelessness, but at any rate that Nemesianus is author of some at least of the poems seems made out by these words.

The dedication to Nemesianus, found in the codex Gaddianus and the codex Rehdigeranus, can hardly be genuine, for there is no mention of Nemesianus in the poems, and it is foreign to the usage of antiquity to dedicate a poem to a man and yet make no mention of him in it. Moreover, if we are agreed that Nemesianus wrote the last four eclogues we cannot suppose that the first seven which he has so freely imitated were dedicated to him. For assuredly it would be mere barefaced plagiarism to copy whole lines from a collection of poems dedicated to oneself.

It is possible that the poems of Calpurnius ended 'Explicit Calpurnii bucolicon,' and those of Nemesianus began 'Aurelii Nemesiani Carthaginensis bucolicon incipit,' and from the confusion of these two sentences the spurious dedication may have arisen.

It therefore appears that the first seven poems are by Calpurnius, the last four by Nemesianus, and that the dedication to Nemesianus is a mere error. Yet this erroneous dedication is almost the sole ground for making Calpurnius a contemporary of Carus and his sons, Carinus and Numerianus; for that the Junius Calpurnius, mentioned

¹ *Explicit* and *feliciter* are commonly used in late Latin, to mark the end of a book. *Explicit* is probably a contraction of *explicitus* (*est*

liber), 'the book is ended.'

The pious ejaculation 'Deo gratias, Amen,' also is often found at the conclusion of a work.

by Vopiscus in his life of Carus, is the same as the author of the poems is little more than a gratuitous assumption, and is inconsistent with the traditional name of our poet, which seems to have been Titus Calpurnius. Calpurnius was a not uncommon name, and the only *rapprochement* between the two persons seems to be that Junius Calpurnius was a Syracusan, while Titus Calpurnius is called Siculus. Glaeser, however, conjectures that the epithet Siculus is owing to his poems being in the style of the Sicilian Theocritus.

But it seems a serious objection to Glaeser's theory, that in the Parma edition, mentioned above, we find not only *Titi Calphurnii Siculi*, but also *ad Nemesianum Karthaginensem* and *Aurelii Nemesiani Poetae cartaginensis*, from which it appears that no more is intended than to indicate the birth or residence of the poets, respectively, in Sicily and Carthage.

The games described in VII. cannot be identified with those in the reign of Carinus and Numerianus (*see* Vopiscus, 30. 18), for such games were exhibited by several of the emperors; and none of the novelties referred to by Vopiscus (*e.g.* the *neurobaten*, *tichobaten*, *pythaulas*, and *ludum Sarmaticum*) are mentioned in this poem.

Had Calpurnius lived at the era suggested, it is quite inconceivable that he should have mentioned but one Caesar, and yet there is but one referred to in I., IV., and VII., for it is absurd to allege that the plurals *dei* and *numina* must refer to two princes. It will be sufficient to show this in one case. In VII., 78, we read

Dic age, dic Corydon, mihi quae sit forma deorum.

This merely means that Corydon, in describing the appearance of Caesar, would be describing the appearance of

the gods, and this is clear also from the following words, in which Corydon describes *one* person only :—

... Utcunque tamen conspeximus ipsum
Longius ac, nisi me visus decepit, in uno
Et Martis vultus et Appollinis esse notavi.

The eclogues could not have been written while Carus was alive, for such emphasis would not have been laid on his youth, nor would all mention of his sons have been omitted; nor were they written after the death of Carus while Carinus and Numerianus were surviving, for he would not have mentioned one of them without the other; nor again in the interval between the death of Numerianus and Carinus, for it would be strange that no mention occurs of the death of father or son, and the peace so often mentioned by Calpurnius could not have been said to prevail during these reigns, for throughout this period wars were going on with either the Sarmatians or Persians, either in the north or against Diocletian. Finally, the first and fourth eclogues contain reproaches on the preceding times which are not appropriate to the time of either Aurelian, Tacitus, Florian, or Probus.

As the first seven poems therefore cannot belong to the reign of Carus or his sons, one must next look to the notes of time contained in the poems themselves, and we find that the principal conditions to be satisfied are, that the emperor, during whose reign the poems were written, was young, handsome, and himself a poet, that he exhibited splendid games, that his accession was coincident with the beginning of an era of peace and freedom, that the preceding reign had been tyrannical, and that the appearance of a comet was fresh in men's minds. All these conditions seem to be satisfied in the person of Nero and of him alone, as will appear from the following particulars :—

1°. The reference in I. 77 *sq.* seems to be to the comet, which, we learn from Pliny, Suetonius, and Dion Cassius, appeared at the end of the reign of Claudius and beginning of that of Nero. The words of Calpurnius are :

Cernitis ut puro nox jam vicesima coelo
Fulgeat et placida radiantem luce cometem
Proferat, ut liquido niteat sine vulnere plenus ?
Numquid utrumque polum, sicut solet igne cruento
Spargit et ardenti scintillat sanguine lampas ?
At quondam non talis erat, cum Caesare raptō
Indixit miseris fatalia civibus arma.

Now we learn from the first lines of the eclogue that it was in autumn that Corydon and Ornitus found these lines cut on the beech tree, and we know that it was on the 13th of Oct., 54 A.D., that Claudius died and Nero succeeded to the empire, at which time a comet is said to have appeared. Suet. Claud. 46: *praesagia mortis ejus praecipua fuerunt, exortus crinitae stellae, qucm cometen vocant*, &c. Dion Cassius 60. 35: οὕτω μὲν ὁ Κλαύδιος μετήλλαξεν (*i. e.* died), ἐς τοῦτό τε ὃ τε ἀστήρ ὁ κομήτης ἐπὶ πλείστον ὀφθεῖς καὶ ἡ ψεκὰς ἡ αἱματώδης . . . ἔδοξε σημεῖναι. Pliny, 2. 26: *sed cometes nunquam in occasura parte coeli est, terrificum magna ex parte sidus atque non leviter pīatum, ut civili motu Octavio consule iterumque Pompei et Caesaris bello, in nostro vero aevo circa veneficium quo Claudius Caesar imperium reliquit Neroni, ac deinde principatu ejus adsidium prope ac saevum.* It appears from these passages that the comet was visible for a considerable time, and the poet would not hesitate to regard it as an omen of disaster at the close of the despotic reign of Claudius, and as an omen of good fortune during the happy *quinquennium Neronis*.

Pliny's statement that the comet was *saevum* as well as *assiduum*, during the reign of Nero, is explained by his having written when the enormities of Nero's later years

had effaced the memory of his early promise, at which time every omen would of course receive a sinister interpretation.

2°. Calpurnius speaks often of the youth of the emperor and of his beauty. Nero was but seventeen at his accession, and was of handsome appearance according to Suetonius (51) and to Seneca, the latter of whom compares him to Apollo (*de morte Claudii* 4) almost in the same words as Calpurnius, VII. 83.

3°. The emperor's early eloquence is praised in I. 44, *maternis causam qui vicit in ulnis*.^a Now Nero (Suet. 7) pleaded for the people of Bologna in Latin, and those of Rhodes and Ilium in Greek, at the early age of thirteen, which might justify the poet's eulogium.

4°. The emperor seems to be described as a poet, IV. 87, and we have abundant testimony that Nero posed in that character.

5°. In I. 69 *sq.*, Faunus foretells that during the new reign constitutional rights and the authority of the consuls will be respected, and this accords with the promises which Tacitus (A. 13. 4) says Nero made in the senate at the beginning of his reign.

6°. The games described in VII. may correspond with those in Suet. 11, and the wooden amphitheatre of VII., 23. 24, answers to that mentioned by Suet. Nero 12, and Tac. A. 13. 31.

7°. The revivifying of the tree in IV. 107 *sq.*, answers to Tac. A. 13. 58: *eodem anno* (A. D., 58) *Ruminalem arborem in comitio, quæ octingentos et triginta ante annos Remi Romulique infantiam texerat, mortuis ramalibus et arescente trunco deminutam prodigii loco habitum est, donec in novos fetus revivisceret.*

^a For this remarkable hyperbole, *cf.* τὸν ἐν ἀγκάλαις ἔπατον, τὸν ἐκ τοῦ μαστοῦ πατρώζοντα ἥδη, Themistius,

Oratio Consularis ad Jovianum (Oratio 12 in Paris edition, 1618).

8°. The reference to the cessation of civil war (I. 46) at the first glance does not seem appropriate, as the time of Claudius was peaceful, save for five days' mutiny of the legions under Camillus. It may, however, merely allude to Nero's peaceful succession as compared with the civil wars of an earlier period, and was perhaps suggested by Tac. A. 13. 4: *ceterum peractis tristitiae imitamentis curiam ingressus, et de auctoritate patrum et consensu militum prae-fatus, consilia sibi et exempla capessendi egregie imperii memoravit, neque inventam armis civilibus aut domesticis discordiis imbutam; nulla odia, nullas injurias nec cupidinem ultionis afferre.*

9°. The treatment of the senate described I. 60, sq. corresponds with Seneca's statement, quoted by Haupt, that Claudius put to death thirty senators.

The evidence here adduced in favour of the Neronian era seems overwhelming; and the reign of no other emperor presents such a number of coincidences.

The most weighty argument in support of a later date is that advanced by Professor Maguire in HERMATHENA, No. v., p. 139. He points out that Justinian (Inst. II. 1. 39) tells us that Hadrian gave (*concessit*) the property in treasure-trove to the finder; and to this law he thinks reference is made in I. 117:—

Jam neque damnatos metuit jactare ligones
Fossor et invento, si fors dedit, utitur auro,
Nec timet, ut nuper, dum jugera versat arator
Ne sonet offenso contraria vomere massa,
Jamque palam presso magis et magis instat aratro.

He therefore regards Calpurnius as the poet of Commodus, and supposes that the legislation of Hadrian, the founder of the Aelian line, is mentioned, to glorify Commodus, his lineal representative.

This view, however, involves some serious difficulties,

for it makes *nuper*, as Prof. Maguire points out, refer to a period some fifty or sixty years previous; and it seems a poor compliment to seek a ground of eulogy in so distant an ancestor:—*τίς πατέρ' αἰνήσει εἰ μὴ κακοδαίμονες υἱοί*; The lines of Calpurnius are sufficiently explained by the very probable supposition that the *delatores* were not encouraged during the celebrated *quingennium Neronis*.

This view is confirmed by the tale of Herodes Atticus, who, having found a large treasure, and being afraid, no doubt, of the *delatores*, placed it at the disposal of Nerva, who was then emperor. Nerva told him to use (*χρῶ*) it himself; and, when Herodes Atticus cautiously replied that it was too great for him to use, said, "Well, then, abuse (*παραχρῶ*) it, for the treasure is yours."

The law of Hadrian, of course, was not passed until long after this occurrence; so we see that sometimes, at any rate, the more constitutional emperors did not enforce their claim to treasure-trove.

The story of Nero's attempt to secure for himself the treasure of Dido, which Caesellius Bassus imagined he had discovered, does not, as Haupt shows, affect the argument, as this occurrence was subsequent to Nero's early years of equitable rule. The words of Calpurnius imply a recent reign of terror, and are as appropriate to the time of Claudius as they are inappropriate to that of the philosopher in the purple who preceded Commodus.

The blemishes in language, *naevos recentioris Latinitatis*, as Wernsdorf calls them, which are adduced to show a later period, are for the most part either erroneous readings, or occur in the last four poems, which are not from the pen of Calpurnius. Even from these latter poems some of the irregularities should be removed: *e. g.*, in XI. 22, Glaeser gives *perdunt spina rosas*, following the reading of the Neapolitan MS., and therefore admits the unusual form, *spinum* n., instead of *spina* f.; but Haupt, it would seem

rightly, thinks we should, in this case, leave the Neapolitan MS., and follow the majority of the codices in reading *perdit*. *Perdunt*, of the Neapolitan MS., may easily be a dittography from the preceding line, where that form occurs. As to the form *oleastrum*, II. 44, it was probably in use, side by side, with *oleaster*, for a grammarian quoted by Haupt says:—*oleastrum generis neutri: sed Virgilius foliis oleaster amaris*.

The question as to who is referred to by Calpurnius under the name of Meliboeus is of consequence in fixing the date of the poems; and whether L. Annaeus Seneca or Calpurnius Piso, who seem to satisfy best the conditions of the problem, be our choice, the reign of Nero is again the period at which the poet wrote.

In IV. 53, *sq.*, Meliboeus is not only described as a poet under the special patronage of Apollo and the Muses, but is also said to be an authority on the winds and weather; and on these latter subjects Seneca treated in his *Quaestiones Naturales*; while the reference to Apollo and the Muses is satisfied by his numerous tragedies written in iambic senarii, and interspersed with choral parts in anapaestic and other metres.

In the work just named he devotes an entire book to meteors and another to comets; and this gives a peculiar propriety to the mention of the comet in I. 77, *sq.*, just before the poet commends the poem to the good offices of his patron:—

Forsitan Augustas feret haec Meliboeus ad aures.

It is true that Calpurnius Piso is also spoken of as under the patronage of Apollo in the *Laudatio Pisonis*, which Haupt, on account of some peculiarities in its form, attributes to Calpurnius Siculus. But this is, after all, a

somewhat vague argument for the identification, while the more definite references to weather and comets seem applicable to Seneca alone.

That both Seneca and Piso were patrons of art appears from Juv. 5, 108, sq. :—*Nemo petit, modicis quae mittebantur amicis A Seneca, quae Piso bonus, quae Cotta solebat Largiri.*

Wernsdorf, who places Calpurnius in the time of Carus and his sons, identifies Meliboeus with C. Junius Tiberianus.

But whatever date is assigned to Calpurnius, his most important claim on our attention must be the intrinsic merit of his work; and we must therefore inquire whether he exhibits the true characteristics of bucolic poetry, presenting to us an idealised but not unreal picture of rural life, in language which is natural and simple, but, at the same time, dramatic and vivid.

In IV., Calpurnius, under the name of Corydon, professes to take Tityrus, *i.e.* Virgil, as his model; and the unsurpassed smoothness of his verses goes far to justify his boldness in attempting to vie with the father of Roman idyllic poetry. Meliboeus at first warns him of the presumption of his attempt, but afterwards pronounces a warm panegyric (IV. 150, sq.) on his flowing and honeyed diction; and few critics will hesitate to endorse the judgment which Calpurnius has put in the mouth of his patron. I have already touched on this subject, and will not devote more space to it now, as a perusal of Calpurnius' verses themselves is the true way of learning their rhythmic charm. Our poet may, however, claim credit for much more than mere smoothness of versification. Dramatic vividness is no less a characteristic of his amoebean poems, under which title we may include all, except I., V., and VII. The few simple lines in which he describes the silent awe

of nature at the name of Caesar are perhaps unsurpassed as a specimen of vivid word-painting.

Am. Aspicis, ut virides audito Caesare silvae
Conticeant? Memini, quamvis urgente procella,
Sic nemus immotis subito requiescere ramis,
Et dixi, deus hinc, certe deus, expulit Euros:
Nec mora, Pharsalae solverunt sibila cannae.

Cor. Aspicis ut teneros subitus vigor excitet agnos?
Utque superfuso magis ubera lacte graventur,
Et nuper tonsis exundent vellera foetis?
Hoc ego jam, memini, semel hac in valle notavi,
Et venisse Palem, pecoris dixisse magistros.

Scarcely less striking is the celebrated passage in II., beginning, *Adfuit omne genus pecudum*, &c., where the rustic deities and all the powers of nature are spell-bound in listening to the praises of the virgin Crotale.

Calpurnius seems to have been a warm enthusiast about the beauties of nature and the charms of country life; and whether he is describing the shady grove, with its moss-lined cave, through whose arched windings is faintly heard the purling of the neighbouring stream, or painting some rustic scene, where 'the village train' (*paganica turba*) applauds the sports held at the cross-roads, he proves himself no mere conventional verse-maker, but a genuine sympathiser with the charms of rustic life and scenery.

Though no women are interlocutors in the eclogues, several are mentioned in the course of the poems. Among these, the most interesting is the unsullied Crotale, whose name supplies a title to II. Her two admirers, Astacus and Idas, however, vie rather in describing their own merits than those of their mistress.

We hear more of Phyllis, who is represented as *mobilior*,

ventis. She has quarrelled with her lover; and he tells his friend Iollas of his desire to be reconciled to her. Scaliger pronounces this eclogue (III.) to be *merum rus, idque inficetum*, an opinion endorsed by Conington. But, in spite of these high authorities, I must say the poem seems to me to possess much delicacy, both of sentiment and expression.

It would be difficult to find in classical literature a more chivalrous view of the relation of the sexes than in the advice of Iollas to his friend:—

Tu prior illi (*to her*)
Victas tende manus; decet indulgere puellae
Vel cum prima nocet.

The letter of apology is also simply and forcibly expressed. Lycidas first describes his unhappy state since their estrangement, and then, having acknowledged his fault and begged forgiveness, gently reminds her of his former attentions in sending her the earliest lilies and roses. He does not forget to describe the wealth which he is ready to place at her disposal, an argument which seems to have had weight in Arcadia, no less than in other countries; but this plea is given a modest and unobtrusive position in the middle of his letter, which both at the opening and close bases its appeal to Phyllis on the warmth and sincerity of the passions that her charms have excited.

Of the other female characters, Alcippe appears as the confidante of Phyllis; Petale and Leuce are coy, but not cruel, and Calliroe represents the rich heiress. Nemesianus is much less fortunate in his women. Donace's wildness carries her so far that her parents are obliged to put her under strict restraint; Meroe is *immitis, dura*, and *superba*, and Mycale is a witch.

About Calpurnius himself, we learn from his poems that envious poverty often pulled his ear (*vellit saepius*

aurem), and bid him mind the sheep-fold, rather than the unmoneyed (*inanis*) Muse, that at first he was inclined to follow this advice, but changed his plans with a change of emperors; and that when on the point of leaving for Spain he was taken up by Meliboeus, a patron, who not only provided for his immediate wants, but conveyed his poems to the emperor.

Calpurnius devotes three of his eclogues (I., IV. and VII.) to the praise of the emperor. He adopts a strain of the most extravagant, and, according to our notions, blasphemous adulation; but we must remember that a Roman not only believed in the divine right of kings, but held the emperor to be actually a god.

The angry altercation in VI. finds a parallel in Virgil, E. 3, and the singing match in Sir Philip Sidney's *Arcadia* (29), entitled Nico and Dorus, reads like a parody on both passages.

The fifth eclogue has much more of a didactic than bucolic character. It contains the advice of the aged Mycon to his son Canthus on pastoral matters, and is evidently modelled on the *Georgics* of Virgil.

The seventh eclogue is that most generally known, partly because it is quoted by Merivale, as containing a description of the Colosseum. If Merivale is right in the supposed reference, we could not, of course, place Calpurnius earlier than the reign of Vespasian. There is nothing, however, in the poem to compel assent to Merivale's view, and he seems to have adopted it in order to add something to the scanty accounts we have of the celebrated Flavian amphitheatre.

The sole argument he adduces for the late date of Calpurnius is the description of the emperor at the close of this eclogue:

Et Martis vultus et Apollinis esse putavi (*sic*),

which, he thinks, points to Domitian. The words, however, seem quite as applicable to Nero; and at any rate this solitary plea can have little weight against the string of arguments enumerated above. The eclogue consists in the narrative of a shepherd, who describes to his friend Lycotas the spectacles which he had seen during a visit to the metropolis.

There is a lack of direct local reference in Calpurnius; indeed, perhaps, the only such allusions are those to the sheep of Tarentum and to the city of Rome.

This omission has an advantage, as that violation of the unities of which Virgil is so often guilty in introducing into Italian scenes the flora and natural features of Sicily, is less distinctly felt when the scene of the poems is not specifically stated.

The title Delos prefixed to the first eclogue has raised some discussion. It is most plausibly explained as a dedication to the Delian god of Prophecy, owing to the oracle of Faunus which it contains, and which is modelled on the celebrated Pollio of Virgil.

Another remarkable inscription is that of the seventh eclogue, namely, *Templum*, where, it has been observed, *Amphitheatrum* would be more suitable.

Pastoral poetry, in a degree beyond any other kind of literature, is marked by a uniformity in both subject-matter and treatment throughout all ages.

In the Idyls of Theocritus, the Bucolics of Virgil, Tasso's *Aminta*, Sir Philip Sidney's *Arcadia*, and Pope's *Pastorals*, the same passions are described, the same scenes depicted, and the same mannerisms introduced.

It is, therefore, no just cause of offence that Calpurnius follows the (even in his time) traditional usage.

A shepherd in search of a lost sheep or heifer meets a brother shepherd, and then in company, forgetting their more prosaic duties, they beguile the noontide hours in

singing their mistresses' praises, or in poring over the characters cut in the bark of some neighbouring tree, until the lengthening shadows warn them to water their thirsty flocks, and afford the poet a convenient pretext for concluding his lay. Not unfrequently the love-sick¹ swains engage in a vocal and instrumental contest, some passer-by acting as judge; and so common were these trials of skill, that the power of song was regarded as a regular characteristic of Arcadia. See Virgil, E. 7, 4, where *Arcades ambo* is to be explained, not as in Byron's well-known translation, but by the words which occur in the next line: *et cantare pares et respondere parati*. Compare also *ib.* 10, 32: *solī cantare periti Arcades*.

This was, however, probably an idealised conception of Arcadian talent; and more matter-of-fact writers make Arcadia the type of dulness and stupidity. See Juv. 7. 160: *nil salit Arcadio juveni*.

A brief account of the four pastorals of Nemesianus will suffice, as I have already said something about them, and as they are considerably inferior, both in merit and interest, to the poems we have been considering. They contain, however, some passages of much beauty; and Fontenelle pronounces the third eclogue, in which Pan celebrates the praises of Bacchus, to be superior in elegance of invention to the sixth eclogue of Virgil, on which it is evidently modelled.

The funeral ode to Meliboeus is of considerable merit.

¹ That Calpurnius considered love a legitimate subject of his song is distinctly stated in II. 92:

Carmina poscit amor, nec fistula cedit amori.

Much difficulty has been made about the concluding words of this line, and several different readings suggested. Cicero's well-known words: *Cedant*

arma togae, i.e. 'military merit must vail to civil,' however, suggest the true explanation. Translate 'Love calls for song, nor does the shepherd's pipe vail to love;' i.e. the pipe has not to make way and retire in silence before love; but, on the contrary, love calls for its strains.

It bears the strange title of *Epiphunus*, which is a curious mixture of Latin and Greek (*ἐπι*, *funus*).

Timetas, at the request of Tityrus, sings an obituary poem in honour of Meliboeus, in terms which seem to identify him with the Meliboeus of the first seven poems. This is far the strongest internal argument for attributing the last four poems to the same author as the first seven; and it is strange that it has not, so far as I know, been made use of by those who maintain the unity of authorship.

It does not, however, seem sufficient to outweigh the arguments urged above in favour of the separatist theory; and the poem may, perhaps, be regarded as an imitation of Virgil's *Daphnis*, suggested to Nemesianus by the want he felt of such a patron as had encouraged his predecessor and model, Calpurnius.

The second eclogue contains a curious description of a tame nightingale; and the fourth, entitled *Eros*, is remarkable for its abrupt termination, and for being the only one of these poems which contains a recurring burden. Two shepherds sing alternately six verses each, always ending with the words—

Cantet amat quod quisque : levant et carmina curas.

These four poems are distinguished from those of Calpurnius, as has been said above, by the absence of any reference to the emperor, and by the different type of female character which they portray.

Bucolic poetry, unreal and fanciful as has always been its treatment, is based upon one deep-seated feeling, which explains the attraction that this kind of composition possesses: I mean upon the love of nature and country scenes. Hence we can understand the charm of the simple but feeling verses of Calpurnius, and must regret that he is almost the only poet who has helped to per-

petuate, in Latin literature, the pastoral vein introduced by Virgil from a Sicilian source.

Next to his own contributions to literature, the greatest obligation under which Virgil has placed us consists in his having been the guide of Dante through his phantom Inferno; but while acknowledging these higher claims to our gratitude, we need not forget his humbler service in pointing Calpurnius and the succeeding bucolic poets to those scarcely less imaginary regions of Arcadia, in which the joys and charms of country life make us forget its toilsome realities.

CHARLES H. KEENE.

I have just received from Prof. Maguire two valuable suggestions bearing on the date of Calpurnius. Firstly, he remarks that the discovery in the Colosseum of an arrangement for allowing the beasts to rise from underground seems to satisfy the description in VII. 69-72. Secondly, we learn from IV. 36. *sq.* that Calpurnius had contemplated emigrating to Spain; and Prof. Maguire suggests that such an enterprise was more likely to recommend itself after Vespasian had extended the fuller Latin rights (*Majus Latium*—*Plin.* N. H. III. 1; *Gaius*, I. 95) to the whole of Spain. These arguments, however, cannot be taken as conclusive of the late date of Calpurnius, for the stage machinery, if one may so call it, need not have been peculiar to one structure; and a man who was starving at home, as Calpurnius tells us he was, may well have been willing to try his fortune in a new country, even though it did not enjoy full Latin rights.

I may add that, should it be objected that the strictures of Calpurnius on the preceding reign are too severe to be

justly applicable to Claudius, a little consideration will show that this is really a strong argument in favour of the view taken in this Paper. It has been shown above that in all probability the Meliboeus of Calpurnius was Seneca. The poet would, therefore, naturally adopt his patron's somewhat exaggerated view of the shortcomings of Claudius; and we find a perfect parallel for the disparaging expressions of Calpurnius in Seneca's bitter political satire, which is known by the title *Ἀποκολούντωσις*.

C. H. K.

THE CROSS-REFERENCES IN THE 'PHILOSOPHUMENA.'

IN the present state of learned opinion I count it to be needless to vindicate for Hippolytus the authorship of the *Refutation of all Heresies*, edited by Miller in 1851, under the name of Origen's *Philosophumena*. The method of refutation which Hippolytus employs is frequently no more than the statement of the heretical doctrine in the heretic's own words. Those with whom he had to deal refused to communicate their treasured knowledge to their disciples until after a long course of training, and then under an absolute promise of secrecy. So he proposes to shame them by dragging their profoundest mysteries to the light of day, when it will be easy to show that their doctrines were derived, not from Scripture, but from the teaching of different heathen philosophers. Hippolytus may claim to have had great success in his task of exposure. He was able to disinter, and give some abstract of, more than a dozen heretical works of which no other writer shows any knowledge; viz. (A) a treatise belonging to the sect called Naassene, containing, with various illustrations, heads of doctrine, said to have been originally communicated by James the Lord's brother to Mariamne—this being the work of which Hippolytus gives the most copious extracts; (B) a work emanating from the sect called Peratae; (C) an astrological treatise, entitled 'Proastioi,' in use in the same sect; (D) a work called the Paraphrase of Seth, in use among heretics called Sethites; (E) a work called Baruch, and possibly other books purporting to be written by one Justinus; (F) the work called ἡ μεγάλη

Ἀποφάσεις, purporting to be written by Simon Magus; (G) a Valentinian treatise, evidently different from any of the sources used by Irenaeus; (H) a Basilidian treatise; (I) a work of Prepon, inscribed to Bardesanes, but of this Hippolytus gives little more than the name; and he is nearly as brief in his account of (J) a work of Apelles which he cites; (K) a work of the sect called Docetae, heretics who seem to be quite different from those to whom the name is elsewhere applied; (L) a treatise by Monoimus, an Arabian; (M) a work of Hermogenes; (N) an Elchasaite treatise. Probably this enumeration underrates the extent of the heretical library collected by Hippolytus; but in all, or nearly all, the cases I have mentioned, I think he is plainly not copying Irenaeus or any previous orthodox writer, but drawing his account of the heresies from books which he had himself seen.

It need hardly be said what a valuable addition this newly-discovered treatise of Hippolytus was recognized as making to our previous knowledge of the Gnostic sects. Heresies which formerly had scarcely been known to us except through the refutations of their opponents, and some whose very names had been unheard of, were now presented to us as described in the very words of those who maintained them. Accordingly, all writers on Gnosticism since 1851 have made it their business to analyse and tabulate the information which this work of Hippolytus gives concerning the various sects. The chief controversy that has arisen is one suggested by the use made of our four Gospels, in almost all the writings of which Hippolytus gives an abstract. This has made it interesting to discuss whether the heretical writings in question had any great antiquity at the time when Hippolytus wrote, or whether they can be regarded as nearly contemporary with himself. But in studying them I have come to feel misgivings on a more fundamental question, namely, whether some of them are

genuine heretical writings at all, and whether the hitherto unknown sects described in them ever existed. Of the good faith of Hippolytus I entertain no doubt. I feel sure that he draws his accounts from books which he had actually seen, and which he had no doubt were text-books in heretical sects; and I have no doubt either that he judged rightly about some of these books. The Valentinian treatise, for example, is one on which we are able to pronounce a judgment by means of other abundant information concerning that heresy; and the judgment is altogether favourable to the *bonâ fide* character of the treatise possessed by Hippolytus. But a question arises when we regard the extent and variety of the heretical library which he got together. How did he come to get hold of so many heretical books of which we do not hear from anyone else, and which he describes with the air of one who feels that he is making a revelation of secrets which previously had not been dragged to light? If the documents all belonged to a single sect we could imagine that a converted heretic surrendered to his spiritual father the vile works on which he had pinned his faith during the days of his ignorance. But the books described by Hippolytus come from sects so numerous and so unlike each other that we cannot imagine that any chance brought these various works into the possession of one man. I think the facts can only be explained by the supposition that, if chance brought one heretical work or two to the knowledge of Hippolytus, he set himself diligently to discover others for the purposes of exposure and refutation, and so became known as an ardent collector of such literature. And then the misgiving arises: collectors are sometimes imposed on by dealers; can we be sure that Hippolytus was never taken in? Might not the heretic who sold him one document and got a good price for it have been tempted to manufacture others with no other object than that of selling them to the orthodox bishop?

I would not venture to express a suspicion which to many will appear very unreasonable, if it were not that I think that the facts which have suggested it to me deserve to be studied, with the view of finding the most probable account of them. These facts are the many queer coincidences in arguments and expressions between different heretical writings described by Hippolytus, suggesting that though these heretical documents appear to have been unknown to all the orthodox except Hippolytus, yet heretics of very different schools must have been acquainted with the works of the others. I have made no systematic search for cross-references in the *Refutation*, but those which I have happened to notice are very numerous, and I believe that if anyone were to take the trouble to make a concordance for the work he could discover many more.

When striking and unusual expressions are found to be common to two different works, three explanations of the matter may be given—(a) both works are indebted to a common source; (b) the writer of one had seen the other; (c) the two works have the same author. The remains of heretical literature are too scanty, and my own knowledge of Greek philosophical writings too small, to enable me always to exclude the first explanation. For instance, an extract from the Sethite work which I have lettered (D), begins (p. 138, 38)¹ with the comprehensive formula Πᾶν ὃ τι νοήσει ἐπινοεῖς, ἥ καὶ παραλείπεις μὴ νοθῆν, and in the Simonian work which I have called (F) we find (p. 163, 99) τὸ μὲν φανερόν τοῦ πυρὸς πάντα ἔχει ἐν ἑαυτῷ ὅσα ἂν τις ἐπινοήσῃ, ἥ καὶ λάθῃ, παραλιπὼν τὸν ἀορατόν· τὸ δὲ κρυπτὸν πᾶν ὃ τι ἐννοήσῃ τις νοητὸν καὶ πεφευγὸς τὴν αἴσθησιν, εἰ καὶ παραλείπει μὴ διανοηθεῖς. It is to be noted that the coincidence is only as to the use of a formula and not at all as to the application

¹ The references are to Miller's pages and lines.

of it; and if the formula is one common in Greek philosophical writers there is no more to be said about it. We shall presently see that the same formula is found in two or three other places in the *Philosophumena*; and in this instance I believe that the case is one of literary obligation between the two writers, because this is only one of several coincidences between them. The extract just cited from (D) goes on to speak of arts being potentially in the human soul, though only exhibiting themselves after time and instruction: οἰονεὶ γενήσεται τοῦτο τὸ παιδίον αὐλητής, ἐγχερόισαν αὐλητῇ, ἢ γεωμέτρης γεωμέτρῃ, γραμματικῇ γραμματικός, τέκτων τέκτονι κ. τ. λ. But the same distinction between the potential and the actual is found in (F) (p. 166, 60) ὡς ἡ δύναμις ἢ γραμματικὴ ἢ γεωμετρικὴ ἐν ἀνθρώπῳ ψυχῇ. Προσλαβοῦσα γὰρ ἡ δύναμις τέχνην, φῶς τῶν γινομένων γίνεται· μὴ προσλαβοῦσα δὲ, ἀτεχνία καὶ σκότος, καὶ ὡς ὅτε οὐκ ἦν, ἀποθνήσκοντι τῷ ἀνθρώπῳ συνδιαφθείρεται. Now on turning back to the document (D) we find immediately following on the distinction between the potential and the actual αἱ δὲ τῶν ἀρχῶν οὐσίαι φῶς καὶ σκότος. But the curious point is that, with this literary coincidence between the two documents, there is scarcely any doctrinal agreement.

Two other coincidences between the Sethian and Simonian books may be mentioned. The Sethian system lays great stress on the triplicity of nature, of which it gives numerous illustrations, quoting Shem, Ham and Japhet; Abraham, Isaac and Jacob; &c. And amongst the rest it appeals to the fact that there were three days before the sun and moon, ἢ ὅταν λέγῃ, τρεῖς ἡμέρας πρὸ ἡλίου καὶ σελήνης γεγενέσθαι (p. 145, 82). Triplicity is no part of the Simonian system which traces the origin of things to six roots with a seventh power. And yet the author thinks it necessary to give an exposition of the three days before the sun and moon, and in words very close to those used in the Sethite document. "Ὅταν οὖν λέγωσιν ὅτι εἰσὶ τρεῖς ἡμέραι πρὸ ἡλίου

καὶ σελήνης γεγενημένοι (p. 167, 85). Again the Sethite writer anticipates modern mathematics in speaking of an infinity of the second order, δυνάμεις οὖσαι κατ' ἀριθμὸν ἀπειράκις ἄπειροι (p. 140, 80). But the ἀπειράκις ἀπείρως is found also in the Simonian document (p. 165, 36). And it also occurs in the document (K., p. 264).

If we are to infer from these coincidences that there is a relation of literary dependence between the documents, although the name of Simon might lead us to imagine that the Simonian document must be the older, yet I consider that an examination of the particular coincidences, as well as tokens of superior originality in the Sethite document, lead to the conclusion that the borrowing, if any, has been on the side of Simon.¹

If the instances just given seem to afford no more than chance coincidences, the same can hardly be said of that which I have next to mention. The Sethite book speaks (p. 146, 73) of the dissolution of compounds through the tendency of one of the components to rush to a kindred substance: πάντα τὰ συγκεκριμένα ἔχει ῥοὴν ἴδιον καὶ τρέχει πρὸς τὰ οἰκεία, ὡς σίδηρος πρὸς τὴν ἥρακλειαν λίθον, καὶ τὸ ἄχυρον ἠλέκτρον πλησίον, καὶ τῷ κέντρῳ² τοῦ θαλασσίον ἱέρακος τὸ χρυσίον. Those who are better read than I, can tell whether they have read elsewhere of the power of the spine of this fish to attract gold. I have never happened to come across such a thing, and I have looked in what I imagined to be the most likely places. But in the document (A) (p. 121, 49) it is taught that, from the living waters which the Saviour supplies, each draws that for which his nature has an attraction; and we have the same illustration: προσέρχεται ἐκάστη φύσει ἀπὸ τοῦ ὕδατος τούτου τὸ

¹ In order to avoid misapprehension, I wish to explain that I do not suppose the whole account given by Hippolytus of the system of Simon to have been

taken from the *Μεγάλη Ἀποφάσις*. I imagine ch. 19 to have been derived from a lost work of Justin Martyr.

² Elsewhere τῇ κερκίδι.

οἰκτεῖον μᾶλλον ἢ σίδηρος τῇ ἡρακλείᾳ λίθῳ καὶ ὁ χρυσὸς τῇ τοῦ θαλασσίου ἱέρακος κερκίδι, καὶ τῷ ἀχύρῳ τὸ ἤλεκτρον. Once more in the Peratic document, which I have called (B), we find this illustration again (p. 137, 6), ὥσπερ ὁ νάφθας τὸ πῦρ πανταχόθεν εἰς ἑαυτὸν ἐπισπώμενος, μᾶλλον δὲ ὥσπερ ἡ ἡρακλεία λίθος τὸν σίδηρον, ἄλλο δὲ οὐδεν' ἢ ὥσπερ ἡ τοῦ θαλασσίου ἱέρακος κερκὶς τὸ χρυσίον, ἕτερον δὲ οὐδέν' ἢ ὥσπερ ἄγεται ὑπὸ τοῦ ἡλέκτρον τὸ ἄχυρον. I shall reconsider my opinion if proofs are offered that the illustration I have quoted was in common use elsewhere; but meanwhile I think this instance alone sufficient to prove that there is some relation of literary dependence between the three documents.

The three documents, which all contain this curious illustration, notwithstanding much outward unlikeness, agree in certain fundamental conceptions. All insist on the triplicity of the universe, identify the Logos with the serpent, and represent the object of his mission as the releasing of the elements imprisoned in matter. The Naassene writer and the Sethite agree (107. 53, 145. 23) in proving their doctrine of triplicity by the Homeric quotation 'Τριχθὰ δὲ πάντα δέδασται, ἕκαστος δ' ἔμμορε τιμῆς.' And common to almost all the new documents which Hippolytus has made known to us is a tyrannical exegesis which, when proof for any doctrine is needed, can force any text of Scripture or any heathen myth to bear the required testimony. General agreements of this kind, of course, do not suffice to establish identity of authorship. They may be regarded as only showing affinities between the schools to which the respective writers belonged, or characteristics of the age in which they lived. But this explanation will not suffice when the same doctrine is elicited in different documents from the same unlikely source. Thus, in the Sethite document, p. 143, one of the proofs given of the triplicity of the universe is that Moses says (Deut. v. 22): σκότος καὶ γνόφος καὶ θύελλα; on which

the writer remarks: οὗτοι οἱ τρεῖς λόγοι. Now, in the Docetic document, described p. 263, the origin of the universe is traced to three Aeons; and we are told that Moses has not omitted to bear testimony to this: λέγων οἱ λόγοι τοῦ θεοῦ τρεῖς εἰσὶν, σκότος, γνόφος, θύελλα, καὶ οὐ προσέθηκεν. Οὐδὲν γὰρ ὁ θεὸς τοῖς τρισὶ προσέθηκεν αἰῶσιν. Two persons were not likely to have independently found a proof of triplicity in the words of Moses: ταῦτα τὰ ῥήματα ἐλάλησε κύριος πρὸς πᾶσαν συναγωγὴν ὑμῶν ἐν τῷ ὄρει ἐκ μέσου τοῦ πυρός· σκότος, γνόφος, θύελλα, φωνὴ μεγάλη, καὶ οὐ προσέθηκε.

I think the instances adduced are sufficient to prove that there are more than chance coincidences between different sections of the work of Hippolytus; and I will now proceed to give a list of those I have noted; but I scarcely ever take up the book without being struck by one which had escaped me before. The Naassene document (A) begins (p. 95) by quoting a Gnostic hymn: Ἀπὸ σοῦ πάτερ, καὶ διὰ σὲ μήτηρ, τὰ δύο ἀθάνατα ὀνόματα; with which may be compared the words of Irenaeus (I. xxix. 3): 'refrigerant in hoc omnia hymnizare magnum Aeona. Hinc autem dicunt manifestatam Matrem, Patrem, Filium.' But, in the abstract of the teaching of Monoimus, given p. 269, we find (line 40): Αὕτη μήτηρ, αὕτη πατήρ, τὰ δύο ἀθάνατα ὀνόματα. And, on examination, we find this to be one of several coincidences. The extract from Monoimus begins by quoting a line from Homer: ὠκεανὸς γένεσις τε θεῶν γένεσις τ' ἀνθρώπων; but this line is also appealed to in the Naassene document (p. 105). A little further on (p. 270) we find: ἐκείνη μία ἔστιν ἡ πολυπρόσωπος καὶ μυριόμοτος καὶ μυριώνυμος; but in the Naassene document (p. 117), we have: οὗτος ἔστιν ὁ πολυώνυμος μυριόμοτος. We have the formula already referred to (p. 269. 37): ὅσα ἂν τις εἴπῃ, καὶ παραλείπῃ, μὴ νοήσας. Compare, also, ἄνωθεν ῥύνετες κάτω (p. 115. 3) with ῥύνεισθ' ἄνωθεν (p. 270. 71). Monoimus, like

the Naassene writer, makes his first principle 'Man,' and attributes the work of creation to the 'Son of Man' (compare p. 95. 43; p. 269. 21, 26). The coincidences which I have pointed out are enough to establish that, though Hippolytus failed to observe the affinities between them, the Naassene document and the writings ascribed to Monoimus belong to the same school, and probably reached Hippolytus from the same quarter. The author of the Naassene document was evidently a crazy person of very wide reading and extensive knowledge of Gnostic literature. I was disposed to entertain the hypothesis that it was he who possessed genuine writings of Monoimus, who used them in composing a rhapsody of his own, and subsequently handed over his whole library to Hippolytus. But the difficulty of making hypotheses is felt when we observe how different systems are interlaced by mutual coincidences. Thus, the extracts from Monoimus equally present points of contact with the Peratic system (B): both lay stress on an illustration from Moses' rod, in both places described as *ἡ ράβδος ἡ στρεφόμενη* (p. 133. 89; p. 271. 84); and both quote (p. 124. 39; p. 270. 55) Col. ii. 9 (*ἐν αὐτῷ κατοικεῖ πᾶν τὸ πλήρωμα τῆς θεότητος σωματικῶς*) with the same two variations (*ἡνδόκησε κατοικῆσαι*, instead of *κατοικεῖ*, and leaving out *τῆς θεότητος*, so as to convey the sense, 'the whole pleroma was pleased to dwell in him.') Monoimus seems to agree with the two preceding writers (p. 119. 1; p. 132. 72) in condemning all sexual intercourse, and describes the men outside his sect as *ὅσοι περὶ τὸ γέννημα τῆς θηλείας εἰσὶ πεπλανημένοι* (p. 270. 66; p. 271. 97; and for *γέννημα θηλείας*, see also 141. 21; 162. 71). But there are equally close affinities between the Naassene writer and the Peratic. In addition to some already mentioned, may be noticed that *ὁ κόσμος ἰδικός*, which is a technical phrase in the Peratic system (p. 124. 25; p. 125. 58; p. 130. 18), is a phrase which

also more than once slips from the pen of the Naassene writer (pp. 194. 68; 107. 71).

Again, the *αὕτη μήτηρ, αὕτη πατήρ*, already noticed as a point of contact between the Naassenes and Monoimus, brings both into union with the system of Simon. He has (p. 171. 20) *αὕτη ἐστὶ δύνάμις μία διηρημένη ἄνω, κάτω, αὐτὴν γεννώσα, αὐτὴν αὖξουσα, αὐτὴν ζητοῦσα, αὐτὴν εὐρίσκουσα, αὐτῆς μήτηρ οὖσα, αὐτῆς πατήρ, αὐτῆς ἀδελφὴ, αὐτῆς σύζυγος, αὐτῆς θυγάτηρ, αὐτῆς υἱὸς, μήτηρ, πατήρ, ἐν οὖσα ρίζα τῶν ὅλων*. With this passage, too, may be compared the description given by Monoimus (p. 269. 35), *ἀδιαίρετος, διαιρετὴ, πάντα εἰρηνικὴ, πάντα μαχικὴ, &c.* And, again, what Monoimus says (p. 271. 75) of the six powers instrumental in creation has affinity with Simon's doctrine of six 'roots.' But Simon's system is equally related to the Naassene and Peratic documents. Some coincidences have been already mentioned. Possibly the very title, *ἡ μεγάλη ἀποφάσις* is to be discovered in *ῥῆμα ἀποφάσεως τῆς μεγάλης δυνάμεως* (p. 117. 57). The verse, 'that we should not be condemned with the world' (1 Cor. xi. 32), appealed to (p. 167. 10), is also quoted (p. 125. 57). Simon has an anatomical speculation (p. 168. 17) concerning Paradise. Paradise is the womb; and the four heads into which the river of Paradise divided itself are explained as certain veins and arteries. The Naassene writer (p. 120) has a kindred speculation. Paradise is the brain; and the four streams go to the eye, the nose, the ear, and the mouth. I find it hard to think that the author of one speculation was ignorant of the other; and yet the one writer does not acknowledge the other as an authority. May it not be that the same author, writing in two different characters, allowed his fancy to sport in different ways?

The system of Justinus appears at first sight to be exceedingly unlike any of the other systems described by

Hippolytus; and yet on close examination it will be found that the Naassene writer shows signs of acquaintance with it. It is surely not an obvious doctrine that Gen. i. 7 speaks of a division between the waters below the firmament in which bathe the *χοϊκοί* and the *ψυχικοί*, and the living water above the firmament in which bathe the living *πνευματικοί* (p. 158. 20). Yet we find this theory of the water above the firmament known to the Naassene writer (p. 121. 44: compare also p. 100. 82). In the passage (p. 121. 45) the verse John iv. 10 is quoted in the form *ἔδωκεν ἄν σοι πιεῖν ζῶν ὕδωρ ἀλλόμενον*, the last word being added from a mistaken recollection of *πηγὴ ὕδατος ἀλλομένου εἰς ζωὴν αἰώνιον* in verse 14. The Sethite writer (p. 143. 69) quotes in the same way *ἀπελούσατο καὶ ἔπιε τὸ ποτήριον ζῶντος ὕδατος ἀλλομένον*. Justinus likewise (p. 158. 17) has the combination *ζῶντος ὕδατος ἀλλομένου*, and speaks of the draught of living water as a *λουτρόν*.

One of the leading ideas of the system of Justinus is the description of the Supreme as *ὁ ἀγαθός*; but this not being peculiar to Justinus, we cannot build anything on the fact that this also is found in the Naassene document (p. 102. 24; 116. 21); nor do I care to compare what is said in the latter place about the gate of heaven with Justinus (153. 71). But Justinus states also (157. 77) that *ὁ ἀγαθός* is the same as Priapus, who *εἰς πάντα ναὸν ἴσταται, ὑπὸ πάσης τῆς κτίσεως τιμώμενος καὶ ἐν ταῖς ὁδοῖς βαστάζων τὰς ὁπώρας ἐπάνω αὐτοῦ, τουτέστι τοὺς καρποὺς τῆς κτίσεως ὧν αἴτιος ἐγένετο*. If the reader takes the trouble to read the commentary on this passage afforded by the Naassene writer (p. 102, 34-54), I think he will find it hard to believe that these strange ideas occurred independently to different persons. The derivation of Priapus, *ὁ πρὶν τι εἶναι ποιήσας* (p. 157. 77) is quite in keeping with the etymological feats of the Naassene writer, of which it is enough to refer, as choice samples, to his explanation (p. 112. 16) who the *τελῶναι* are

who lead the way into the kingdom of heaven, or (p. 100. 74) what is meant by ἀσχημοσύνη in Rom. i. 27. Justinus, also, undertakes to explain (p. 152) what Paradise is, and what the four heads into which its river was divided. The explanation is different from those given in the other documents, and quite as far-fetched; but I think that the inventor of the other two explanations could, without much trouble, have discovered this one.

Long before I exhaust my stock of materials I should exhaust my reader's patience, if I have not done so already; but I must not omit to notice the section on the Docetae which, in my opinion, has all the marks of being a very late manufacture. I have already pointed out its singular coincidence with the Sethite document in its exposition of Deut. v. 22. It agrees with that document also in its theory of triplicity, in its account of the greed of 'the darkness' to seize the ἰδεῖν or χαρακτηρεῖς which escape from the bountiful superior power, and of the Redeemer's mission to recover these entangled ideas: compare 139. 65; 264. 5. The favourite phrase ἀπειράκις ἄπειροι again presents itself (140. 80; 165. 36; 264. 78, 96); and the illustration drawn from the eye (266. 54) recalls 139. 72. It is to be observed that the theory of triplicity in other Gnostic systems is the result of a philosophic speculation which discovers in man or in nature three elements distinct in character, such as the νοερόν, ψυχικόν, and χοικόν; but in this docetic system is quite arbitrary, there being nothing in the system itself to explain why the number should be three rather than a dozen. This Docetic system has affinities with other of the Gnostic systems—with the Simonian, with which it has in common the illustration of the tree (compare 164. 10; 262. 44); and with the Basilidian, with which it agrees in the use of the phrase 'Great Archon' (265. 16), and in starting from a first principle, if not non-existent, at least infinitesimally small. But the system is

clearly post-Valentinian, as may be inferred from the division of the thirty Aeons (268. 4) into 8, 10, and 12—a division quite inconsistent with the triplicity of the docetic system—from the use of the phrase *θεὸς πύρινος* (265. 19), and its representation of the Saviour as the joint offspring of the Aeons (264. 90). The author of the docetic system appears to me to have been a free-thinking Valentinian, who puts forward the theory (268. 95) that all the sects have their elements of truth, though only the perfect understand completely. The Naassene writer seems to me also to betray his Valentinianism. He, too, has the *θεὸς πύρινος* (104. 66, compare 191. 89), the description of Jesus as the joint offspring of the Aeons (95. 56), and the theory of the entry of redeemed souls into a heavenly bride-chamber (116. 25).

What Hippolytus tells of the system of Basilides has, notwithstanding its unlikeness to what is told of Basilides elsewhere, approved itself to so many excellent critics as trustworthy, that I should have no courage to dissent from them, if my faith in Hippolytus's sources of information had not been undermined by the facts already adduced. It is no part of my contention that the Simonides, with whom Hippolytus dealt, sold him no genuine wares; yet if even one of his articles be detected to be spurious, we cannot help being distrustful of the rest. The word Naassene is equivalent to Ophite, yet the Naassenes of Hippolytus are so unlike the Ophites elsewhere described, that he himself does not recognize them as the same sect (see VIII. 20, p. 277. 50); his Sethites are quite unlike those whom Epiphanius describes under the name; his Docetae have no resemblance to those known under that name by anyone else, so that one feels some suspicion of his Basilidians. It is true that his account of their system has fewer coincidences with other systems than are found in other cases; yet there are some. At an early stage we

meet (p. 232. 40) πάντα ὅσα ἐστὶν εἰπεῖν καὶ ἔτι μὴ εὐρόντα παραλε-
 πῆν; the illustration of the Indian naphtha (p. 239) is used
 by the Peratae (p. 137), and in the place assigned to the
 Holy Spirit, and in what is said about its sweet fragrance,
 we have an echo of what was said before. I cannot help
 suspecting this Basilides to be also a Valentinian in dis-
 guise. The Valentinian technical words slip out: δημιουργ-
 γός (pp. 241. 14, 237. 17); ἔκτρωμα (p. 241. 1); τόπος (p. 237.
 99); the same use is made of the texts, Prov. i. 5 (compare
 p. 239. 65, p. 191. 82, Clem. Alex. *Strom.* ii. 48); Ex. vi. 2, 3
 (compare 238. 36, 196. 25); while the μεθόριον πνεῦμα of this
 Basilides seems to be closely related to the Valentinian ὄρος.
 On the most unfavourable supposition, the statements of this
 work deserve some attention. If we are to imagine that a
 heretic contemporary of Hippolytus forged books in the
 name of Basilides and others, still he was a man of much
 learning, and well read in Gnostic theories; so that it may
 be expected that his fictions would have a certain basis of
 fact. It is certainly odd that these strange people to whom
 Hippolytus introduces us, and of whom no one else appears
 to have ever heard, should all be so well acquainted with
 one another.¹

GEORGE SALMON.

¹ I take this opportunity to correct a statement in my *Introduction to the New Testament*, p. 101, that Dr. Harnack was indebted to Dr. Ezra Abbot for his acquaintance with Moesinger's Tatian. Dr. Harnack tells me that the obligation was the other way, Dr. Abbot having, as he believes, heard of the book from him through the intermediation of Dr. Gregory, and that in any case he

was himself the first to quote the book (*Zeitschrift für Kirchengeschichte*, 1879, p. 401). I was misled by Dr. Harnack's generous silence as to his own priority (*Zeitschrift f. K. G.* iv. 489), where he says, 'Der Amerikaner Abbot, der einzige, der meines Wissens bisher von Möisinger's Publication öffentlich Notiz genommen hat.'

GREEK GEOMETRY FROM THALES TO
EUCLID.*

VI.

MENAECHMUS—pupil of Eudoxus, associate of Plato, and the discoverer of the conic sections—is rightly considered by Th. H. Martin¹ to be the same as the Manaechmus of Suidas and Eudocia, ‘a Platonic philoso-

* It is pleasing to see, as I said in the last number of HERMATHENA, that: ‘The number of students of the history of mathematics is ever increasing; and the centres in which the subject is cultivated are becoming more numerous;’ and it is particularly gratifying to observe that the subject has at last attracted attention in England. Since the second part of this Paper was published Dr. Heiberg, of Copenhagen, has completed his edition of Archimedes: *Archimedis Opera Omnia cum Commentariis Eutocii*. e codice Florentino recensuit, Latine vertit notisque illustravit J. L. Heiberg, Dr. Phil. vols. ii. et iii.: Lipsiae, 1881. Dr. Heiberg has been since engaged in bringing out, in conjunction with Professor H. Menge, a complete edition of the works of Euclid, of which two volumes have been published: *Euclidis Elementa*, edidit et Latine interpretatus est J. L. Heiberg, Dr. Phil. vol. i., Libros I–IV continens, vol. ii., Libros V–IX continens, Lipsiae, 1883, 1884. As Heiberg’s edition of Archimedes was preceded by his *Quaestiones Archimedeae*, Hauniae,

1879; so, in anticipation of his edition of Euclid he has published: *Litterar-geschichtliche Studien über Euklid*, Leipzig, 1882, a valuable work, to which I have referred in the last part of this Paper. Dr. Hultsch, of Dresden, informs me that his edition of Autolycus is finished, and that he hopes it will appear at the end of this month (June, 1885). The publication of this work—in itself so important, inasmuch as the Greek text of the propositions only of Autolycus has been hitherto published—will have, moreover, an especial interest with regard to the subject of the pre-Euclidian geometry. The Cambridge Press announce a work by Mr. T. L. Heath (author of the Articles on ‘Pappus’ and ‘Porisms’ in the *Encyclopædia Britannica*) on Diophantus; a subject on which M. Paul Tannery also has been occupied for some time.

The following works on the history of Mathematics have been recently published:—

Marie, Maximilien, *Histoire des Sciences Mathématiques et Physiques*, Tomes I–V, Paris 1883, 1884. The first volume alone—*De Thalès à Dio-*

pher of Alopecconesus; but, according to some, of Proconnesus, who wrote philosophic works and three books

phante—treats of the subject of these Papers. It is, in my judgment, inferior to the *Histoire des Mathématiques* of M. Hoefer, notwithstanding the errors of the latter, to which I called attention in HERMATHENA, vol. iii. p. 161. For the historical part of this volume M. Marie has followed Montucla without making use, or even seeming to suspect the existence, of the copious and valuable materials which have of late years accumulated on this subject. Referring to this, Heiberg (*Philologus* XLIII. *Jahresberichte*, p. 324) says: 'The author has been engaged with his book for forty years: one would have thought rather that the book was written forty years ago.' M. Marie commences his *Preface* by saying: 'The history that I have desired to write is that of the filiation of ideas and of scientific methods;' as if that was not the aim of all recent enlightened inquiries. Hear what Hankel, in *Bullettino Boncompagni*, v. p. 297, *seq.*, says: *La Storia della matematica non deve semplicemente enumerare gli scienziati e i loro lavori, ma essa deve altresì esporre lo sviluppo interno delle idee che vegnano nella scienza* (Quoted by Heiberg in *Philologus*, l. c.).

Gow, James, *A Short History of Greek Mathematics*, Cambridge, 1884. This history, as far at least as geometry is concerned, is not, nor indeed does it pretend to be, a work of independent research. Unlike M. Marie, however, Mr. Gow has to some extent studied the recent works on the subject, and the reader will see that

he has made much use of the first and second parts of this Paper. On the other hand, he has left unnoticed many important publications. In particular, the numerous and valuable essays of M. Paul Tannery, which leave scarcely any department of ancient mathematics untouched, and which throw light on all, seem to be altogether unknown to him. Essays and monographs like these of M. Tannery and others are in fact, with the single exception of Cantor's *Vorlesungen über Geschichte der Mathematik*, the only works in which progress in the history of ancient mathematics has of late years been made: Bretschneider's *Geometrie vor Euklides* and Hankel's *Geschichte der Mathematik* are no exceptions; for the former work is a monograph, and the latter, which was interrupted by the death of the author, contains only some fragments of a history of mathematics, and consists in reality of a collection of essays. Should the reader look at Heiberg's Paper in the *Philologus*, XLIII., 1884, pp. 321-346 and pp. 467-522, which has been referred to above, he will see how numerous and how important are the publications on Greek mathematics which have appeared since the opening of a new period of mathematico-historical research with the works of Chasles and Nesselmann more than forty years ago.

A glance at the subjoined list of the Papers of a single writer—M. Paul Tannery—relating to the period from Thales to Euclid, will enable the reader

on Plato's Republic.' From the following anecdote, taken from the writings of the grammarian Serenus and handed

to form an opinion on the extent of the literature treated of by Dr. Heiberg.

Mémoires de la Société des Sciences physiques et naturelles de Bordeaux (2^e Série).—Tome I., 1876, Note sur le système astronomique d'Eudoxe. Tome II., 1878, Hippocrate de Chio et la quadrature des lunules; Sur les solutions du problème de Délos par Archytas et par Eudoxe. Tome IV., 1882, De la solution géométrique des problèmes du second degré avant Eudoxe. Tome V., 1883, Seconde note sur le système astronomique d'Eudoxe; Le fragment d'Eudème sur la quadrature des lunules.

Bulletin des Sciences Mathématiques et Astronomiques.—Tome VII., 1883, Notes pour l'histoire des lignes et surfaces courbes dans l'antiquité. Tome IX., 1885, Sur l'Arithmétique Pythagorienne. Le vrai problème de l'histoire des Mathématiques anciennes.

Annales de la faculté des lettres de Bordeaux.—Tome IV., 1882, Sur les fragments d'Eudème de Rhodes relatifs à l'histoire des mathématiques. Tome V., 1883, Un fragment de Speusippe.

Revue philosophique de France et de l'étranger, dirigée par M. Ribot.—Mars, 1880, Thalès et ses emprunts à l'Égypte.

Novembre, 1880, Mars, Août et Décembre, 1881. L'éducation Platonicienne.

¹Theonis Smyrnaei Platonici *Liber de Astronomia*, Paris, 1849, p. 59. A. Böckh (*Ueber die vierjährigen Sonnenkreise der Alten*, Berlin, 1863, p. 152), Schiaparelli (*Le Sfere Omocentriche di Eudosso, di Callippo e di Aristotele*,

Milano, 1875, p. 7), and Zeller (*Plato and the Older Academy*, p. 554, note (28), E. T.), hold the same opinion as Martin: Bretschneider (*Geom. vor Euklid.*, p. 162), however, though thinking it probable that they were the same, says that the question of their identity cannot be determined with certainty. Martin and Bretschneider, both, identify Menaechmus Alopeconnesius with the one referred to by Theon in the fragment (*k*) given below. Max C. P. Schmidt (*Die fragmente des Mathematikers Menaechmus*, Philologus, Band XLII. p. 77, 1884), on the other hand, holds that they were distinct persons, but says that it is certainly more probable that the Menaechmus referred to by Theon was the discoverer of the conic sections, than that he was the Alopeconnesian, inasmuch as Theon connects him with Callippus, and calls them both *μαθηματικοί*. Schmidt, however, does not give any reason in support of his opinion that the Alopeconnesian was a distinct person. But when we consider that Alopeconnesus was in the Thracian Chersonese, and not far from Cyzicus, and that Proconnesus, an island in the Propontis, was still nearer to Cyzicus, and that, further, the Menaechmus referred to in the extract (*k*) modified the system of concentric spheres of Eudoxus, the supposition of Th. H. Martin (*l. c.*) that this extract occurred in the work of the Alopeconnesian on Plato's *Republic* in connexion with the distaff of the Fates in the tenth book becomes probable.

down by Stobaeus, he appears to have been the mathematical teacher of Alexander the Great:—Alexander requested the geometer Menaechmus to teach him geometry concisely; but he replied: ‘O king, through the country there are private and royal roads, but in geometry there is only one road for all.’² We have seen that a similar story is told of Euclid and Ptolemy I. (*HERMATHENA*, vol. iii. p. 164).

What we know further of Menaechmus is contained in the following eleven fragments:—

(a). Eudemus informs us in the passage quoted from Proclus in the first part of this Paper (*HERMATHENA*, vol. iii. p. 163), that Amyclas of Heraclea, one of Plato’s companions, and Menaechmus, a pupil of Eudoxus and also an associate of Plato, and his brother, Dinostratus, made the whole of geometry more perfect.⁴

(b). Proclus mentions Menaechmus as having pointed out the two different senses in which the word element, στοιχείον, is used.⁵

(c). In another passage Proclus, having shown that many so-called conversions are false and are not properly conversions, adds that this fact had not escaped the notice of Menaechmus and Amphinomus and the mathematicians who were their pupils.⁶

(d) In a third passage of Proclus, where he discusses

² Stobaeus, *Floril.*, ed. A. Meineke, vol. iv. p. 205. Bretschneider (*Geom. v. Euklid.*, p. 162) doubts the authenticity of this anecdote, and thinks that it may be only an imitation of the similar one concerning Euclid and Ptolemy. He does so on the ground, that it is nowhere reported that Alexander had, besides Aristotle, Menaechmus as a special teacher in geometry. This is an insufficient reason for re-

jecting the anecdote, and, indeed, it seems to me that the probability lies in the other direction, for we shall see that Aristotle had direct relations with the school of Cyzicus.

³ The fragments of Menaechmus have been collected and given in Greek by Max C. P. Schmidt (*l. c.*).

⁴ Procl., *Comm.* ed. Friedlein, p. 67.

⁵ *Ibid.*, p. 72.

⁶ *Ibid.*, pp. 253-4.

the division of mathematical propositions into problems and theorems, he says, that whilst in the view of Speusippus and Amphinomus and their followers all propositions were theorems, it was maintained on the contrary by Menaechmus and the mathematicians of his School (οἱ περὶ Μέναιχμον μαθηματικοί) that they should all be called problems—the difference being only in the nature of the question stated, the object being at one time to find the thing sought, at another time, taking a definite thing, to see either what it is, or of what kind it is, or what affection it has, or what relation it has to something else.⁷

(e). In a fourth passage Proclus mentions him as the discoverer of the conic sections. The passage is in many respects so interesting that it deserves to be quoted in full.

‘Again, Geminus divides a line into the compound and the uncompounded—calling a compound that which is broken and forms an angle; then he divides a compound line into that which makes a figure, and that which may be produced *ad infinitum*, saying that some form a figure, *e. g.* the circle, the ellipse (θυρεός),⁸ the cissoid, whilst others do not form a figure, *e. g.* the section of the right-angled cone [the parabola], the section of the obtuse-angled cone [the hyperbola], the conchoid, the straight line, and all such. And again, after another manner, of the uncompounded line one kind is simple and the other mixed; and of the simple,

⁷ *Ibid.*, pp. 77, 78.

⁸ ‘δ θυρεός (the door-shape, oblong; cf. Heron Alexandr., ed. Hultsch, *Definition.* 95, p. 27 : ποιοῦσα σχῆμα θυροειδές). It is called by Eutocius, *Comm.* to Apollon. p. 10: ἔλλειψιν, ἣν καὶ θυρεὸν καλοῦσι, and is used several times in Proclus.’ So Heiberg, who adds that in one passage it occurs in an extract from Eudemus, and says that we may perhaps assume that we have here the

original name for the ellipse (*Nogle Puncter af de graeske Mathematikeres Terminologi*, Philologisk-historiske Sam funds Mindeskrift, Kjobenhavn, 1879, p. 7). With relation to the same term, Heiberg, in his *Litterargeschichtliche Studien über Euklid*, Leipzig, 1882, p. 88, quotes a passage of the *Φαινόμενα* of Euclid which had hitherto been overlooked: εἰδὲν γὰρ κῶνος ἢ κύλινδρος ἐπιπέδῳ τμηθῆναι μὴ

one forms a figure, as the circular; but the other is indefinite, as the straight line; but of the mixed, one sort is in planes, the other in solids; and of that in planes, one kind meets itself as the cissoid, another may be produced to infinity; but of that in solids, one may be considered in the sections of solids, and the other may be considered as [traced] around solids. For the helix, which is described about a sphere or cone, exists around solids, but the conic sections and the spirical are generated from such a section of solids. But as to these sections, the conics were conceived by Menaechmus, with reference to which Eratosthenes says—

‘Nor cut from a cone the Menaechmian triads’;

but the latter [the spirics] were conceived by Perseus, who made an epigram on their invention :

‘Perseus found the three [spirical] lines in five sections,
and in honour of the discovery sacrificed to the gods.’

‘But the three sections of the cone are the parabola, the hyperbola, and the ellipse; but of the spirical sections one kind is inwoven, like the *hippopede*;’⁹ and another kind is

παρὰ τὴν βασιλιν, ἡ τομὴ γίνεται δευγώνιου κώνου τομῇ, ἥτις ἐστὶν ὁμοία θυρεῶ, ed. D. Gregory, p. 561; and says that *θυρεός* was probably the name by which the curve was known to Menaechmus. It may be observed, however, that an ellipse is not of the shape of a door, neither is a shield, which is a secondary signification of *θυρεός*; the primary signification of the word is not ‘door’, but ‘large stone’ which might close the entrance to a cave, as in Homer (*Odyssey*, ix.); such a stone, or boulder, as may be met with on exposed beaches is often of a flattened oval form, and the names

of a shield of such a shape, and of an ellipse, may have been thence derived.

⁹ τῶν δὲ σπειρικῶν τομῶν ἡ μὲν ἐστὶ ἐμπλεκόμενη, δοικυία τῇ τοῦ ἵππου πέδῃ. The *hippopede* is also referred to in the two following passages of Proclus ἡ ἵπποπέδη, μία τῶν σπειρικῶν ὁδοῶ (ed. Fried. p. 127), and καίτοιγε ἡ κισσοειδὴς μία ὁδοῶ ποιεῖ γωνίαν καὶ ἡ ἵπποπέδη (*ibid.* p. 128). In HERMATHENA, vol. v. p. 227, I said that a passage in Xenophon, *De re equestri*, cap. 7, explains why the name *hippopede* was given to the curve conceived by Eudoxus for the explanation of the motions of the planets, and in particular their

dilated in the middle, and becomes narrow at each extremity; and another being oblong, has less distance in the middle, but is dilated on each side.'¹⁰

(f). The line from Eratosthenes, which occurs in the preceding passage, is taken from the epigram which closes his famous letter to Ptolemy III., and which has been already more than once referred to. We now cite it with its context.

μηδὲ σύ γ' Ἀρχύτῳ δυσμήχανα ἔργα κυλίνδρων
μηδὲ Μενεχμείους κωνοτομῆν τριάδας
δίζηται, . . .¹¹

(g). In the letter itself the following passage, which has

retrograde and stationary appearances, and also to one of the *spirics* of Perseus, each of which curves has the form of the lemniscate. The passage in Xenophon is as follows:—Ἰππασίαν δ' ἐπαινοῦμεν τὴν πέδην καλουμένην· ἐπ' ἀμφοτέρας γὰρ τὰς γνάθους στρέφεσθαι ἐθίζει. Καὶ τὸ μεταβάλλεσθαι δὲ τὴν ἰππασίαν ἀγαθόν, ἵνα ἀμφοτέραι αἱ γνάθοι κατ' ἐκάτερον τῆς ἰππασίας ἰσάζωνται. Ἐπαινοῦμεν δὲ καὶ τὴν ἑτερομήκη πέδην μᾶλλον τῆς κυκλοτεροῦς. *Ibid.* cap. 3. Τοὺς γε μὴν ἑτερογνάθους μὲν καὶ ἡ πέδη καλουμένη ἰππασία, . . . This curve was named *πέδη* from its resemblance to the form of the loop of the wire in a snare, which was in fact that of a figure of 8. Some writers have given a different, and, to me it seems, not a correct, interpretation of the origin of this term. Mr. Gow, for example (*A Short History of Greek Mathematics*, Cambridge, 1884, p. 184), says: 'Lastly, Eudoxus is reported to have invented a curve which he called *ἵπποπέδη*, or "horse fetter," and

which resembled those hobbles which Xenophon describes as used in the riding school.' In the next page Mr. Gow says: 'Eudoxus somehow used this curve in his description of planetary motions, . . .' This is not correct: the two curves were of a similar form—that of the lemniscate—and, therefore, the same name was given to each; but they differed widely geometrically, and were quite distinct from each other. See Knoche and Maerker, *Ex Procli successoris in Euclidis elementa commentariis definitionis quartae expositionem quae de recta est linea et sectionibus spiricis commentati sunt* J. H. Knochi et F. J. Maerkerus, Herefordiae, 1856, p. 14 *et seq.*; and Schiaparelli, *Le Sfere Omocentriche di Eudosso, di Callippo e di Aristotele*, Milano, 1875, p. 32 *et seq.*

¹⁰ Procl. *Comm.* pp. 111, 112.

¹¹ Archimedes, ex. rec. Torelli, p. 146; Archim., *Opera*, ed. Heiberg, vol. iii., p. 112.

been already quoted (*Hermathena*, vol. v., p. 195), is found :

‘The Delians sent a deputation to the geometers who were staying with Plato at Academia, and requested them to solve the problem [of the duplication of the cube] for them. While they were devoting themselves without stint of labour to the work, and trying to find two mean proportionals between the two given lines, Archytas of Tarentum is said to have discovered them by means of his semi-cylinders, and Eudoxus by means of the so-called *curved lines*. It was the lot of all these men to be able to solve the problem with satisfactory demonstration, while it was impossible to apply their methods practically so that they should come into use ; except, to some small extent and with difficulty, that of Menaechmus.’¹²

(*h*). The solution of the *Delian Problem* by Menaechmus is also noticed by Proclus in his *Commentary on the Timaeus of Plato*:—‘How then, two straight lines being given, it is possible to determine two mean proportionals, as a conclusion to this discussion, I, having found the solution of Archytas, will transcribe it, choosing it rather than that of Menaechmus, because he makes use of the conic lines, and also rather than that of Eratosthenes, because he employs the application of a scale.’¹³

(*i*). The solutions of Menaechmus—of which there are two—have been handed down by Eutocius in his *Commentary on the Second Book of the Treatise of Archimedes On the Sphere and Cylinder*, and will be given at length below.¹⁴

¹² *Ibid.* ex. rec. Torelli, p. 144 ; *ibid.* ed. Heiberg, vol. iii. pp. 104, 106.

¹³ Procl. in *Platonis Timaeum*, p. 149 in libro iii. (ed. Joann. Valder, Basel, 1534). I have taken this quotation and reference from Max C. P. Schmidt, *Die fragmente des Mathe-*

matikers Menaechmus, *Philologus*, xlii. p. 75. Heiberg (*Archim. Opera*, vol. iii. Praefatio v.) also gives this passage, but his reference is to p. 353, ed. Schneider.

¹⁴ *Archim.*, ed. Torelli, pp. 141 *et seq.* ; *Archim., Opera*, ed. Heiberg, vol. iii. pp. 92 *et seq.*

(j). We learn from Plutarch that 'Plato blamed Eudoxus, Archytas, and Menaechmus, and their School, for endeavouring to reduce the duplication of the cube to instrumental and mechanical contrivances; for in this way [he said] the whole good of geometry is destroyed and perverted, since it backslides into the things of sense, and does not soar and try to grasp eternal and incorporeal images; through the contemplation of which God is ever God'.¹⁵

The same thing is repeated by Plutarch in his *Life of Marcellus* as far as Eudoxus and Archytas are concerned, but in this passage Menaechmus, though not mentioned by name, is, it seems to me, referred to. The passage is:— 'The first who gave an impulse to the study of mechanics, a branch of knowledge so prepossessing and celebrated, were Eudoxus and Archytas, who embellish geometry by means of an element of easy elegance, and underprop by actual experiments and the use of instruments, some problems, which are not well supplied with proof by means of abstract reasonings and diagrams. That problem (for example) of two mean proportional lines, which is also an indispensable element in many drawings:—and this they each brought within the range of mechanical contrivances, by applying certain instruments for finding mean proportionals (μεισογράφους) taken from curved lines and sections (καμπύλων γραμμῶν καὶ τμημάτων). But, when Plato inveighed against them with great indignation and persistence as destroying and perverting all the good there is in geometry, which thus absconds from incorporeal and intellectual to sensible things, and besides employs again such bodies as require much vulgar handicraft: in this way *mechanics* was dissimulated and expelled from geometry, and being for a long

¹⁵ Plut. *Quaest. Conviv.* lib. viii. q. 2, 1; Plut. *Opera*, ed. Didot, vol. iv. p. 876.

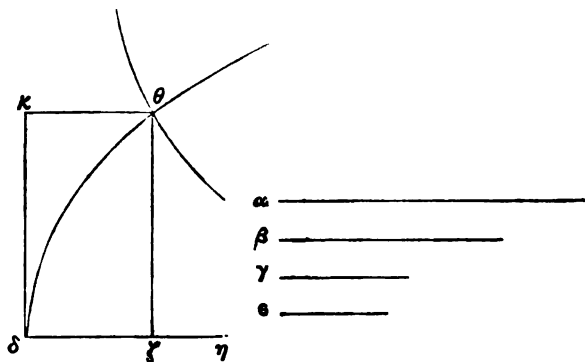
time looked down upon by philosophy, became one of the arts of war.¹⁶

(*k*). Theon of Smyrna relates that 'he [Plato] blames those *philosophers* who, identifying the stars, as if they were inanimate, with spheres and their circles, introduce a multiplicity of spheres, as Aristotle thinks fit to do, and amongst the *mathematicians*, Menaechmus and Calippus, who introduced the system of deferent and restituent spheres (οἱ τὰς μὲν φερούσας, τὰς δὲ ἀνελιπτούσας εἰσηγήσαντο).'¹⁷

The solutions of Menaechmus referred to in (*z*) are as follows :—

‘AS MENAECHMUS.

‘Let the two given straight lines be α , ϵ ; it is required to find two mean proportionals between them :—



‘Let it be done, and let them be β , γ : and let the

¹⁶ Ibid. *Vita Marcelli*, c. 14, sec. 5; Plut. *Opp.*, ed. Didot, vol. i. pp. 364, 5. The words κ . γ . in this passage refer to the curves of Eudoxus (see HERMATHENA, vol. v. pp. 217 and 225); $\tau\mu$. refers to the solution of Archytas, and also, in my judgment, to the conic sections. Instead of $\tau\mu$. we should, no doubt, expect to meet

$\tau\omicron\mu\omega\acute{\nu}$; but Plutarch was not a mathematician, and the word, moreover, occurs in a biographical work: to this may be added, that in one of the *Definitions* of Heron (*Def.* 91, p. 26, ed. Hultsch), we find $\tau\mu\eta\mu\alpha$ used for section.

¹⁷ Theonis Smyrnaei Platonici *Liber de Astronomia*, ed. Th. H. Martin,

straight line $\delta\eta$, given in position and limited in δ , be laid down; and at δ let $\delta\zeta$, equal to the straight line γ , be placed on it, and let the line $\theta\zeta$ be drawn at right angles, and let $\zeta\theta$, equal to the line β , be laid down: since, then, the three straight lines α , β , γ are proportional, the rectangle under the lines α , γ , is equal to the square on β : therefore the rectangle under the given line α and the line γ , that is the line $\delta\zeta$, is equal to the square on the line β , that is to the square on the line $\zeta\theta$; therefore the point θ lies on a parabola described through δ . Let the parallel straight lines $\theta\kappa$, $\delta\kappa$ be drawn: since the rectangle under β , γ is given (for it is equal to the rectangle under α , ϵ), the rectangle $\kappa\theta\zeta$ is also given: the point θ , therefore, lies on a hyperbola described with the straight lines $\kappa\delta$, $\delta\zeta$ as asymptotes. The point θ is therefore given; so also is the point ζ .

‘The synthesis will be as follows:—

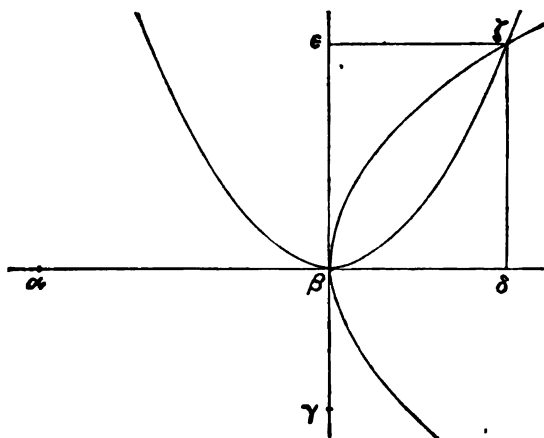
‘Let the given straight lines be α , ϵ , and let the line $\delta\eta$ be given in position and terminated at δ ; through δ let a parabola be described whose axis is $\delta\eta$ and parameter α . And let the squares of the ordinates drawn at right angles to $\delta\eta$ be equal to the rectangles applied to α , and having for breadths the lines cut off by them to the point δ . Let it [the parabola] be described, and let it be $\delta\theta$, and let the line $\delta\kappa$ [be drawn and let it] be a perpendicular; and with

pp. 330, 332, Paris, 1849. The *σφαῖραι ἀνελιρούσαι* were, according to this hypothesis, spheres of opposite movement, which have the object of neutralising the effect of other enveloping spheres (Aristot. Met. xii. c. 8, ed. Bekker, p. 1074). This modification of the system of concentric spheres of Eudoxus is attributed to Aristotle, but we infer from this passage of Theon of Smyrna that it was introduced by

Menaechmus (Theon. Smyrn. *Liber de Astron.* Dissertatio, p. 59). Simplicius, however, in his *Commentary* on Aristotle *De Caelo* (*Schol.* in Aristot. Brandis, p. 498, *δ*), ascribes this modification to Eudoxus himself. Martin (*l. c.*) thinks it probable that this hypothesis was put forward by Menaechmus, in his work on Plato's *Republic*, with reference to the description of the staff of the Fates in the tenth book.

the straight lines $\kappa\delta$, $\delta\zeta$ as asymptotes, let the hyperbola be described, so that the lines drawn from it parallel to the lines $\kappa\delta$, $\delta\zeta$ shall form an area equal to the rectangle under α , ϵ : it [the hyperbola] will cut the parabola: let them cut in θ , and let perpendiculars $\theta\kappa$, $\theta\zeta$, be drawn. Since, then, the square on $\zeta\theta$ is equal to the rectangle under α and $\delta\zeta$, there will be: as the line α is to $\zeta\theta$, so is the line $\zeta\theta$ to $\zeta\delta$. Again, since the rectangle under α , ϵ is equal to the rectangle $\theta\zeta\delta$, there will be: as the line α is to the line $\zeta\theta$, so is the line $\zeta\delta$ to the line ϵ : but the line α is to the line $\zeta\theta$, as the line $\zeta\theta$ is to $\zeta\delta$. And, therefore: as the line α is to the line $\zeta\theta$, so is the line $\zeta\theta$ to $\zeta\delta$, and the line $\zeta\delta$ to ϵ . Let the line β be taken equal to the line $\theta\zeta$, and the line γ equal to the line $\delta\zeta$; there will be, therefore: as the line α is to the line β , so is the line β to the line γ , and the line γ to ϵ : the lines α , β , γ , ϵ are, therefore, in continued proportion; which was required to be found.

OTHERWISE.



‘Let $\alpha\beta$, $\beta\gamma$ be the two given straight lines [placed] at right angles to each other; and let their mean proportionals be $\delta\beta$, $\beta\epsilon$, so that, as the line $\gamma\beta$ is to $\beta\delta$, so is the

line $\beta\delta$ to $\beta\epsilon$, and the line $\beta\epsilon$ to $\beta\alpha$, and let the perpendiculars $\delta\zeta$, $\epsilon\zeta$ be drawn. Since then there is: as the line $\gamma\beta$ is to $\beta\delta$, so is the line $\beta\delta$ to $\beta\epsilon$, therefore the rectangle $\gamma\beta\epsilon$, that is, the rectangle under the given straight line $[\gamma\beta]$ and the line $\beta\epsilon$ will be equal to the square on $\beta\delta$, that is [the square] on $\epsilon\zeta$: since then the rectangle under a given line and the line $\beta\epsilon$ is equal to the square on $\epsilon\zeta$, therefore the point ζ lies on a parabola described about the axis $\beta\epsilon$. Again, since there is: as the line $\alpha\beta$ is to $\beta\epsilon$ so is the line $\beta\epsilon$ to $\beta\delta$, therefore the rectangle $\alpha\beta\delta$, that is, the rectangle under the given straight line $[\alpha\beta]$ and the line $\beta\delta$, is equal to the square on $\epsilon\beta$, that is [the square] on $\delta\zeta$; the point ζ , therefore, lies on a parabola described about the axis $\beta\delta$: but it [the point ζ] lies also on another given [parabola] described about [the axis] $\beta\epsilon$: the point ζ is therefore given; as are also the perpendiculars $\zeta\delta$, $\zeta\epsilon$: the points δ , ϵ are, therefore, given.

‘The synthesis will be as follows:—

‘Let $\alpha\beta$, $\beta\gamma$ be the two given lines placed at right angles to each other, and let them be produced indefinitely from the point β : and let there be described about the axis $\beta\epsilon$ a parabola, so that the square on any ordinate $[\zeta\epsilon]$ shall be equal to the rectangle applied to the line $\beta\gamma$ with the line $\beta\epsilon$ as height. Again, let a parabola be described about $\delta\beta$ as axis, so that the squares on its ordinates shall be equal to rectangles applied to the line $\alpha\beta$. These parabolas cut each other: let them cut at the point ζ , and from ζ let the perpendiculars $\zeta\delta$, $\zeta\epsilon$ be drawn. Since then, in the parabola, the line $\zeta\epsilon$, that is, the line $\delta\beta$ has been drawn, there will be: the rectangle under $\gamma\beta$, $\beta\epsilon$ equals the square on $\beta\delta$: there is, therefore: as the line $\gamma\beta$ is to $\beta\delta$, so is the line $\delta\beta$ to $\beta\epsilon$. Again, since in the parabola the line $\zeta\delta$, that is, the line $\epsilon\beta$, has been drawn, there will be: the rectangle under $\delta\beta$, $\beta\alpha$ equals the

square on $\epsilon\beta$: there is, therefore: as the line $\delta\beta$ is to $\beta\epsilon$, so is the line $\beta\epsilon$ to $\beta\alpha$; but there was: as the line $\delta\beta$ is to $\beta\epsilon$, so is the line $\gamma\beta$ to $\beta\delta$: and thus there will be, therefore: as the line $\gamma\beta$ is $\beta\delta$, so is the line $\beta\delta$ to $\beta\epsilon$, and the line $\beta\epsilon$ to $\beta\alpha$; which was required to be found.'

Eutocius adds—'The parabola is described by means of a compass (*διαβήτου*) invented by Isidore of Miletus, the engineer, our master, and described by him in his Commentary on the Treatise of Heron *On Arches* (*καμαρικῶν*).'

We have, therefore, the highest authority—that of Eratosthenes, confirmed by Geminus, (*e*) and (*f*)—for the fact that Menaechmus was the discoverer of the three conic sections, and that he conceived them as sections of the cone. We see, further, that he employed two of them, the parabola and the rectangular hyperbola, in his solutions of the Delian Problem. We learn, however, from a passage of Geminus, quoted by Eutocius in his Commentary on the *Conics* of Apollonius, which has already been referred to in another connexion (HERMATHENA, vol. iii., p. 169), that these names, *parabola* and *hyperbola*, are of later origin, and were given to these curves by Apollonius:—

'But what Geminus says is true, that the ancients (*οἱ παλαιοί*), defining a cone as the revolution of a right-angled triangle, one of the sides about the right angle remaining fixed, naturally supposed also that all cones were right, and that there was one section only in each—in the right-angled one, the section now called a *parabola*, in the obtuse-angled, the *hyperbola*, and in the acute-angled the *ellipse*; and you will find the sections so named by them. As then the original investigators (*ἀρχαῖων*) observed the two right angles in each individual kind of triangle, first in the equilateral, again in the isosceles, and lastly in the scalene; those that came after them proved the general theorem as follows:—"The three angles of every triangle

are equal to two right angles." So also in the sections of a cone; for they viewed the so-called "section of the right-angled cone" in the right-angled cone only, cut by a plane at right angles to one side of the cone; but the section of the obtuse-angled cone they used to show as existing in the obtuse-angled cone; and the section of the acute-angled cone in the acute-angled cone; in like manner in all the cones drawing the planes at right angles to one side of the cone; which also even the original names themselves of the lines indicate. But, afterwards, Apollonius of Perga observed something which is universally true—that in every cone, as well right as scalene, all these sections exist according to the different application of the plane to the cone. His contemporaries, admiring him on account of the wonderful excellence of the theorems of conics proved by him, called Apollonius the "*Great Geometer*." Geminus says this in the sixth book of his *Review of Mathematics*.¹⁸

The statement in the preceding passage as to the original names of the conic sections is also made by Pappus, who says, further, that these names were given to them by Aristaeus, and were subsequently changed by Apollonius to those which have been in use ever since.¹⁹ In the writings of Archimedes, moreover, the conic sections are always called by their old names, and thus this statement of Geminus is indirectly confirmed.²⁰

¹⁸ Apollonii *Conica*, ed. Halleius, p. 9.

¹⁹ Pappi Alexand. *Collect.* vii. ed. Hultsch, pp. 672 *et seq.* Mr. Gow (*Op. cit.*), p. 186, note, says: 'That Menaechmus used the name "section of right-angled cone," etc., is attested by Pappus, vii. (ed. Hultsch), p. 672.' This is not correct; the name of Menaechmus does not occur in Pappus.

²⁰ Heiberg (*Nogle Puncter af de graeske Mathematikeres Terminologi*, Kjobenhavn, 1879, p. 2) points out that 'Only in three passages is the word ἑλληνισμός found in the works of Archimedes, but everywhere it ought to be removed as a later interpolation, as Nizze has already asserted.' These passages are: 1°. *περὶ κυνοειδέων*, ed. Torelli, p. 270, ed. Heiberg, vol. i.

It is much to be regretted that the two solutions of Menaechmus have not been transmitted to us in their original form. That they have been altered, either by Eutocius or by some author whom he followed, appears not only from the employment in these solutions of the terms parabola and hyperbola, as has been already frequently pointed out,²¹ but much more from the fact that the language used in them is, in its character, altogether that of Apollonius.²²

Let us now examine whether any inference can be drawn from the previous notices as to the way in which Menaechmus was led to the discovery of his curves. This question has been considered by Bretschneider,²³ whose hypothesis as to the course of the inquiry is very simple and quite in accordance with what we know of the state of geometry at that time.

We have seen that the right cone only was considered, and was conceived to be cut by a plane perpendicular to a side; it is evident, moreover, that this plane is at right angles to the plane passing through that side and the axis of the cone. We have seen, further, that if the vertical angle of the cone is right, the section is the curve, of which the fundamental property—expressed now by the equation

pp. 324, 325; 2°. *ibid.* Tor. p. 272, Heib. *id.* p. 332, l. 22; 3°. *ibid.* Tor. p. 273, Heib. *id.* p. 334, l. 5. Heiberg, moreover, calls attention to a passage where Eutocius (*Comm.* to Archimedes, *περὶ σφαίρας καὶ κυλίνδρου* II. ed. Tor. p. 163, ed. Heib. vol. iii. p. 154, l. 9) attributes to Archimedes a fragment he has discovered, containing the solution of a problem which requires the application of conic sections, among other reasons because in it their original names are used.

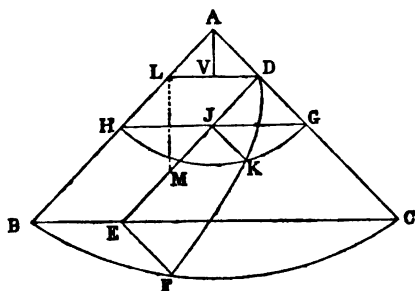
²¹ First, as far as I know, by Reimer, *Historia problematis de cubi duplicatione*, Gottingae, 1798, p. 64, note.

²² *e. g.* παραβολή, ὑπερβολή, ἀσυμπτώτοις, ἄξων, ὀρθὰ πλευρὰ. The original name for the asymptotes αἱ ἐγγίστα is met with in Archimedes, *De Conoidibus*, &c. (αἱ ἐγγίστα τὰς τοῦ ἀμβλυγωνίου κώνου τομᾶς, ed. Heiberg, vol. i. p. 276, l. 22; and again, αἱ ἐγγίστα εὐθεῖαι, κ.τ.λ., *id.* p. 278, l. 1). See Heiberg, *Nogle Punct.*, &c., p. 11.

²³ Bretsch. *Geom.* v. *Eukl.* pp. 156 *et seq.*

$y^2 = px$ —was known to Menaechmus. This being premised, Bretschneider proceeds to show how this property of the parabola may be obtained in the manner indicated.

Let DEF be a plane drawn at right angles to the side AC of the right cone whose vertex is A, and circular base BFC; and let the triangle BAC (right-angled at A) be the section of the cone made by the plane drawn through AC and the axis of the cone. Let the plane DEF cut the cone in the curve DKF, and the plane BAC in the line DE. If, now, through any point J of the line DE a plane HKG be drawn parallel to the base BFC of the cone, the section of the cone made by this plane will be a circle, whose plane will be at right angles to the plane BAC; to which plane the plane of the section DKF is also perpendicular; the



line JK of intersection of these two planes will then be at right angles to the plane BAC, and, therefore, to each of the lines HG and DE in that plane. Let now the line DL be drawn parallel to HG, and the line LM at right angles to LD. In the semicircle HKG the square on JK is equal to the rectangle HJG, that is, to the rectangle under LD and JG, or, on account of the similar triangles JDG and DLM, to the rectangle under DJ and DM. The section of the right-angled cone, therefore, is such that the square on the ordinate KJ is equal to the rectangle under a given line DM and the abscissa DJ.

Bretschneider proceeds then to the consideration of the sections of the acute-angled and obtuse-angled cones and investigates the manner in which Menaechmus may have been led to the discovery of properties similar to those which he had known in the semicircle, and found in the case of the section of the right-angled cone.

Let a plane be drawn perpendicular to the side AC of an acute-angled cone, and let it cut the cone in the curve DKE, and let the plane through AC and the axis cut the cone in the triangle BAC. Through any point J of the line DE let a plane be drawn parallel to the base of the cone, cutting the cone in the circle HKG, whose plane will be at right angles to the plane BAC, to which plane the plane of the section DKE is also perpendicular. The line JK of intersection of these two planes will then be at right angles to the plane BAC; and, therefore, to each of the lines HG and DE in that plane, draw LD and EF parallel to HG, and at the point L draw a perpendicular to LD, intersecting DE in the point M. We have then

$$HJ : JE :: LD : DE$$

$$JG : JD :: EF : DE;$$

therefore,

$$HJ \cdot JG : JE \cdot JD :: LD \cdot EF : DE^2.$$

But, on account of the similar triangles DEF and DLM,

$$EF : DE :: MD : LD.$$

Hence we get

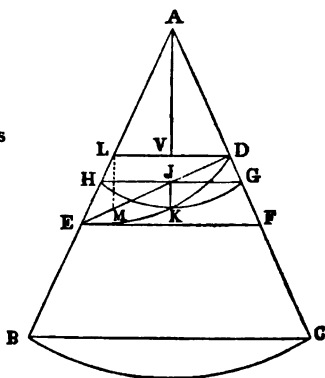
$$HJ \cdot JG : JE \cdot JD :: MD : DE.$$

But in the semicircle HKG

$$JK^2 = HJ \cdot JG;$$

therefore,

$$JK^2 : JE \cdot JD :: MD : DE,$$



that is, the square of the ordinate JK is to the rectangle under EJ and JD in a constant ratio.

The investigation in the case of the section of the obtuse-angle cone is similar to the above.

Bretschneider observes that the construction given for MD in the preceding investigations is so closely connected with the position of the plane of section DKE at right angles to the side AC that it could scarcely have escaped the observation of Menaechmus.

This hypothesis of Bretschneider, as to the properties of the conic sections first perceived by Menaechmus, which properties he employed to distinguish his curves from each other, seems to me to be quite in accordance as well with the state of geometry at that time as with the place which Menaechmus occupied in its development.

A comparison of these investigations with the solution of Archytas (see HERMATHENA, vol. v. p. 196, and *seq.*) will show, as there stated, that 'the same conceptions are made use of, and the same course of reasoning is pursued' in each (*id.* p. 199):

In each investigation two planes are perpendicular to an underlying plane; and the intersection of the two planes is a common ordinate to two curves lying one in each plane. In one of the intersecting planes the curve is in each case a semicircle, and the common ordinate is, therefore, a mean proportional between the segments of its diameter. So far the investigation is the same for all. Now, from the consideration of the figure in the underlying plane—which is different in each case—it follows that:—in the first case—the solution of Archytas—the ordinate in the second intersecting plane is a mean proportional between the segments of its base, whence it is inferred that the extremity of the ordinate in this plane also lies on a semicircle; in the second case—the section of the right-angled cone—the ordinate is a mean proportional between a given straight line and the abscissa; and, lastly, in the third case—the section of an acute-

angled cone—the ordinate is proportional to the geometric mean between the segments of the base.

So far, it seems to me, we can safely go, but not farther. From the first solution of Menaechmus, however, it has been generally inferred that he must have discovered the asymptotes of the hyperbola, and have known the property of the curve with relation to these lines, which property we now express by the equation $xy = a^2$. Menaechmus may have discovered the asymptotes; but, in my judgment, we are not justified in making this assertion, on account of the fact, which is undoubted, that the solutions of Menaechmus have not come down to us in his own words. To this may be added that the words *hyperbola* and *asymptotes* could not have been used by him, as these terms were unknown to Archimedes.

From the passage in the letter of Eratosthenes at the end of extract (g), coupled with the statement of Plutarch (j), Bretschneider infers that it is not improbable that Menaechmus invented some instrument for drawing his curves.²⁴ Cantor considers this interpretation as not impossible, and points out that there is in it no real contradiction to the observation in Eutocius concerning the description of the parabola by Isidore of Miletus.²⁵ Bretschneider adds that if Menaechmus had found out such an instrument it could never have been in general use, since not the slightest further mention of it has come down to us. It appears to me, however, that it is more probable that Menaechmus constructed the parabola and hyperbola by points, though this supposition is rejected by Bretschneider on the ground that such a construction would be very tedious. On the other hand, it seems to me that the words of Eratosthenes would apply very well to such a procedure. We know, on the authority of Eudemus (see HERMATHENA, vol. iii.,

²⁴ *Ibid.* p. 162.

²⁵ *Geschich. der Math.* p. 211.

p. 181), that 'the inventions concerning the application of areas'—on which, moreover, the construction by points of the curves $y^2 = px$ and $xy = a^2$ depend—'are ancient ἀρχαῖα, and are due to the Pythagoreans':²⁶ it may be fairly inferred, then, that problems of application were frequently solved by the Greeks. And we have the very direct testimony of Proclus in the passage referred to, that the inventors of these constructions applied them also to the arithmetical solution of the corresponding problems. It is not surprising, therefore, to find—as Paul Tannery²⁷ has remarked—Diophantus constantly using the expression παραβάλλειν παρὰ in the sense of dividing.²⁸

²⁶ Procl. *Comm.* ed. Fried. p. 419.

²⁷ *De la Solution Géométrique des Problèmes du Second Degré avant Euclide* (Mémoires de la Société des Sciences phys. et nat. de Bordeaux, t. iv., 2^e Série, 3^e Cahier, p. 409). Tannery (Bulletin des Sc. Math. et Astron. Tom. iv., 1880, p. 309) says that we must believe that Menaechmus made use of the properties of the conic sections, which are now expressed by the equation between the ordinate and the abscissa measured from the vertex, for the construction of these curves by points.

²⁸ In a Paper published in the *Philologus* (*Griechische und römische mathematik*, Phil. XLIII, 1884, pp. 474, 5), Heiberg puts forward views which differ widely from those stated above. He holds:—that it is not certain that Menaechmus contrived an apparatus for the delineation of the conic sections: that the only meaning which can be attached to Plato's blame (γ) is, that Archytas, Eudoxus, and Menaechmus had employed, for the duplication of the cube, curves which

could not be constructed with the rule and compass; and that the passage of Eratosthenes merely says that the curves of Menaechmus could be constructed, and not that he had found an apparatus for the purpose. Heiberg says, moreover, that it cannot be doubted that the Pythagoreans solved, by means of the application of areas, the equations, which we now call the vertical equations of the conic sections: but while admitting this, he holds that there is no ground for inferring thence that these equations were employed for the description of the conic sections by points; and says that such a description by points runs counter to the whole spirit of Greek geometry. On the other hand it seems to me that Tannery is right in believing that the *quadratrix* of Dinostratus (the brother of Menaechmus), or of Hippias, the contemporary of Socrates, was constructed in this manner (see Bulletin des Sc. Math. et Astron. *Pour l'histoire des lignes and Surfaces Courbes dans l'Antiquité*, t. VII. p. 279). Moreover, the construction of the para-

The extracts from Proclus (*b*), (*c*) and (*d*) are interesting as showing that Menaechmus was not only a discoverer in geometry, but that questions on the philosophy of mathematics also engaged his attention.

In the passages (*c*) and (*d*), moreover, the expression οἱ περὶ Μέναιχμον μαθηματικοί occurs—precisely the same expression as that used by Iamblichus with reference to Eudoxus (see HERMATHENA, vol. v. p. 219)—and we observe that in (*d*) this expression stands in contrast with οἱ περὶ Σπείσιππον, which is met with in the same sentence. From this it follows that Menaechmus had a school, and that it was looked on as a *mathematical* rather than as a *philosophical* school. Further, we have seen that Theon of Smyrna makes a similar distinction between Aristotle on the one side and Menaechmus and Callippus on the other (*k*). Lastly, we learn from Simplicius that Callippus of Cyzicus, who was the pupil of Polemarchus, who was known to, or rather the friend of (γνωρίμω), Eudoxus, went with Polemarchus to Athens, in order to hold a conference with Aristotle on the inventions of Eudoxus, in order to rectify and perfect them.²⁹

When these statements are put together, and taken

bola and rectangular hyperbola by points depends on the simplest problems of application of areas—the παραβολή without the addition of the υπερβολή or ἑλλειψις.

²⁹ The passage is in the *Commentary* of Simplicius on the second book of Aristotle, *De Caelo*, and is as follows:—
εἶρηται καὶ ὅτι πρῶτος Εὐδόξος ὁ Κνίδιος ἐπέβαλε ταῖς διὰ τῶν ἀνελιττουσῶν καλουμένων σφαιρῶν ὑποθέσεσι, Κάλλιππος δὲ ὁ Κυζικηνὸς Πολεμάρχῳ συσχολάσας τῷ Εὐδόξῳ γνωρίμω, καὶ μετ' ἐκείνου εἰς Ἀθήνας ἐλθὼν, τῷ Ἀριστοτέλει

λοι συγκατεβίω, τὰ ἐπὶ τοῦ Εὐδόξου εὐρεθέντα σὺν τῷ Ἀριστοτέλει διορθούμενος τε καὶ προσαναπληρῶν.—*Scholia* in Aristot. Brandis, p. 498, *b*. Callippus and Polemarchus, as Böckh has remarked, could not have been fellow-pupils of Eudoxus: Callippus, who flourished *circa* 330 B.C., was too young. The meaning of the passage must be as stated above. Böckh conjectures that Polemarchus was about twenty years older than Callippus. See *Sonnenkreise*, p. 155.

in conjunction with the fact mentioned by Ptolemy, that Callippus made astronomical and meteorological observations at the Hellespont,³⁰ we are, I think, justified in assuming that the reference in each is to the School of Cyzicus, founded by Eudoxus, whose successors were—Helicon (probably), Menaechmus, Polemarchus, and Callippus.

From the passages of Plutarch referred to in (j) we see that Plato blamed Archytas, Eudoxus and Menaechmus for reducing the duplication of the cube to mechanical contrivances. On the other hand the solution of this problem, attributed to Plato, and handed down by Eutocius, is purely mechanical. Grave doubts have arisen hence as to whether this solution is really due to Plato. These doubts are increased if reference be made to the following authorities:—

‘Eratosthenes, in his letter in which the history of the Delian problem is given, refers to the solutions of Archytas, Eudoxus, and Menaechmus, but takes no notice of any solution by Plato, though mentioning him by name; Theon of Smyrna also, quoting a writing of Eratosthenes entitled ‘The Platonic,’ relates that the Delians sent to Plato to consult him on this problem, and that he replied that the god gave this oracle to the Delians, not that he wanted his altar doubled, but that he meant to blame the Hellenes for their neglect of mathematics and their contempt of geometry.³¹ Plutarch, too, gives a similar account of the matter, and adds that Plato referred the Delians, who implored his aid, to Eudoxus of Cnidus, and Helicon of Cyzicus, for its solution.³² Lastly, John Philoponus, in his

³⁰ φάσεις ἀπλανῶν ἀστέρων καὶ συναγωγῇ ἐπισημασιῶν, Ptolemy, ed. Halma, Paris, 1819, p. 53.

³¹ Theon. Smyrn. *Arithm.* ed. de

Gelder, Lugdun. Bat. 1827, page 5.

³² Plutarch, *de Genio Socratis, Opera*, ed. Didot, vol. iii. p. 699.

account of the matter, agrees in the main with Plutarch, but in Plato's answer to the Delians he omits all reference to others.³³

Cantor, who has collected these authorities, sums up the evidence, and says the choice lies between—1° the assumption that Plato, when blaming Archytas, Eudoxus, and Menaechmus, added, that it was not difficult to execute the doubling of the cube mechanically; that it could be effected by a simple machine, but that this was not geometry; or 2° the rejection, as far as Plato is concerned, of the communication of Eutocius, on the ground of the statements of Plutarch and the silence of Eratosthenes; or lastly, 3° the admission that a contradiction exists here which we have not sufficient means to clear up.³⁴

The fact that Eratosthenes takes no notice of the solution of Plato seems to me in itself to be a strong presumption against its genuineness. When, however, this silence is taken in connexion with the statements of Plutarch, that Plato referred the Delians to others for the solution of their difficulty, and also that Plato blamed the solutions of the three great geometers, who were his contemporaries, as mechanical—a condemnation quite in accordance, moreover, with the whole spirit of the Platonic philosophy—we are forced, I think, to the conclusion that the sources from which Eutocius took his account of this solution are not trustworthy. This inference is strengthened by the fact, that the source from which the solution given by Eudoxus of the same problem was known to Eutocius, was so corrupt that it was unintelligible to him, and, therefore, not handed down by him.³⁵

³³ Johan. Philop. *ad Aristot. Analyt. post.* i. 7.

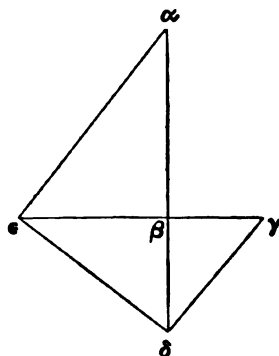
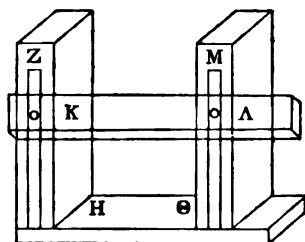
³⁴ Cantor, *Geschich. der Math.*, p. 202.

³⁵ See HERMATHENA, vol. v. p. 225.

The solution attributed to Plato is as follows :—

‘AS PLATO.

‘Two straight lines being given to find two mean proportionals in continued proportion.



‘Let the two given straight lines $\alpha\beta, \beta\gamma$, between which it is required to find two mean proportionals, be at right angles to each other. Let them be produced to δ, ϵ . Now let there be constructed a right angle $ZH\Theta$, and in either leg, as ZH , let a ruler $K\Lambda$ be moved in a groove which is in ZH , so as to remain parallel to $H\Theta$. This will take place if we imagine another ruler connected with Θ, H and parallel to ZH , as ΘM . For the upper surfaces of the rulers $ZH, \Theta M$ being furrowed with grooves shaped like a dove-tail, in these grooves tenons connected with the ruler $K\Lambda$ being inserted, the motion of the ruler $K\Lambda$ will be always parallel to $H\Theta$. This being arranged, let either leg of the angle, as $H\Theta$, be placed in contact with the point γ , and let the angle and the ruler be moved so far that the point H may fall on the line $\beta\delta$, whilst the leg $H\Theta$ is in contact with the point γ , and the ruler $K\Lambda$ be in contact with the line $\beta\epsilon$ at the point K , but on the other side with the point α : so that, as in the diagram, a right

angle be placed as the angle $\gamma\delta\epsilon$, but the ruler KA have the position of the line $\epsilon\alpha$. This being so, what was required will be done; for the angles at δ and ϵ being right, there will be the line $\gamma\beta$ to $\beta\delta$, as the line $\delta\beta$ to $\beta\epsilon$, and the line $\epsilon\beta$ to $\beta\alpha$.³⁸

The instrument is in fact a gnomon, or carpenter's square, with a ruler movable on one leg and at right angles to it, after the manner of a shoemaker's size-stick.

If this solution be compared with the second solution of Menaechmus it will be seen that the arrangement of the two given lines and their mean proportionals is precisely the same in each, and that, moreover, the analysis must also be the same. Further, a reference to the solution of Archytas (see HERMATHENA, vol. V. pp. 196 and 198 (δ)) will show that the only geometrical theorems made use of in the solution attributed to Plato were known to Archytas. Hence it seems to me that it may be fairly inferred that this solution was subsequent to that of Menaechmus, as his solution was to that of Archytas. This, so far as it goes, is in favour of the first supposition of Cantor given above.

On account of the importance of the subject treated of here, I will state briefly my views on the matter in question:—Menaechmus was led by the study of the solution of Archytas, in the manner given above, to the discovery of the curve whose property ($\sigma\acute{\upsilon}\mu\mu\tau\omega\mu\alpha$) is that now defined by the equation $y^3 = px$. Starting from this, he arrived at the properties of the sections of the acute-angled and of the obtuse-angled right cones, which are analogous to the well-known property of the semicircle—the ordinate is a mean proportional between the segments of the diameter. Having found the curve defined by the property, that its ordinate is a mean proportional between a given line and

³⁸Archim. ed. Torelli, p. 135; Archim. Opera, ed. Heiberg, vol. iii. pp. 66 et seq. I have taken the diagrams used

in this solution and that of Menaechmus from Heiberg's edition of Archimedes.

the abscissa, Menaechmus saw that by means of two such curves the problem of finding two mean proportionals could be solved, as given in the second of his two solutions, which, I think, was the one first arrived at by him. The question was then raised—Of what practical use is your solution? or, in other words, how can your curve be described?

Now we have seen in the former parts of this Paper that, side by side with the development of abstract geometry by the Greeks, the practical art of geometrical drawing, which they derived originally from the Egyptians, continued to be in use: that the Pythagoreans especially were adepts in it, and that, in particular, they were occupied with problems concerning the application (*παραβολή*) of areas, including the working of numerical examples of the same. Now any number of points, as near to each other as we please, on the curve $y^2 = px$, can be obtained with the greatest facility by this method; and in this manner, I think, Menaechmus traced the curve known subsequently by the name parabola—a name transferred from the *operation* (which was the proper signification of *παραβολή*) to the result of the operation. We have seen that the same name, *παραβολή*, was transferred and applied to division, which was also a transference of a name of an operation to its result.

Having solved the problem by the intersection of two parabolas, I think it probable that Menaechmus showed that the practical solution of the question could be simplified by using, instead of one of them, the curve $xy = a^2$, the construction of which by points is even easier than that of the parabola. There is no evidence, however, for the inference that Menaechmus knew that this curve was the same as the one he had obtained as a section of the obtuse-angled cone; or that he knew of the existence of the asymptotes of the hyperbola, and its equation in relation to them.

Let us examine now whether anything can be derived from the sources, which would enable us to fix the time of the Delian deputation to Plato—be it real or fictitious.

We have seen that Sotion, after mentioning that Eudoxus took up his abode at Cyzicus, and taught there and in the neighbouring cities of the Propontis, relates that subsequently he returned to Athens accompanied by a great many pupils (πάνυ πολλοὺς περὶ ἑαυτὸν ἔχοντα μαθητάς), for the sake, as some say, of annoying Plato, because formerly he had not held him worthy of attention (HERMATHENA, vol. v. pp. 213, 214). We learn, further, from Apollodorus that Eudoxus flourished about the hundred and third Olympiad—B.C. 367—and it is probable, as Böckh thinks, that this time falls in with his residence at Cyzicus. Now the narrative of Plutarch—that Plato referred the Delians to Eudoxus and Helicon for the solution of their difficulty—points to the time of the visit of Eudoxus and his pupils to Athens, for—1° as we know from Sotion, Plato, and Eudoxus had not been on good terms; and 2° it is not probable that, before this visit, Helicon, who was a native of Cyzicus and a pupil of Eudoxus, as we learn from the spurious 13th *Epistle of Plato*, had become famous or was known to Plato. Böckh assumes, no doubt rightly, that the visit of Eudoxus and his pupils to Athens, and their sojourn there, took place a few years later than Ol. 103, 1—B.C. 367; so that it occurred between the second and third visits of Plato to Sicily (368 B.C. and 361 B.C.).³⁷ To this time, therefore, he refers the remarkable living and working together at the Academy of eminent men, who were distinguished in mathematics and astronomy, according to the report of Eudemus as handed down by Proclus. Now, amongst those named there we find Eudoxus himself, his pupil

³⁷ Böckh, *Sonnenkreise*, &c., pp. 156, 157.

Menaechmus, Dinostratus—the brother of Menaechmus—and Athenaeus of Cyzicus;³⁸ to these must be added Helicon of Cyzicus—more distinguished as an astronomer than a mathematician—who was recommended to Dionysius by Plato,³⁹ and who was at the court of Dionysius in company with Plato at the time of his third visit to Syracuse.⁴⁰

I quite agree with Böckh in thinking that all the pupils of Eudoxus and the citizens of Cyzicus, whom we find at Athens at that time—even though they are not expressly named as pupils of Eudoxus—belonged to the school of Cyzicus: and I have no doubt that to these illustrious Cyziceniens the fame of the Academy—so far at least as mathematics and astronomy are concerned—is chiefly due.⁴¹ It is noteworthy that Aristotle, at the time of this visit, so famous and so important in consequence of the impetus thereby given to the mathematical sciences, had recently joined the Academy, and was then a young man; and it is easy to conceive the profound impression made by Eudoxus and his pupils on a nature like that of Aristotle; and an explanation is thus afforded as well of the great respect which he entertained for Eudoxus, as of the cordial relations which existed later

³⁸ See HERMATHENA, vol. iii., p. 163.

³⁹ *Epist. Plat.* xiii.

⁴⁰ Plutarch, *Dion.*

⁴¹ Zeller says: 'Among the disciples of Plato who are known to us, we find many more foreigners than Athenians: the greater number belong to that eastern portion of the Greek world which since the Persian War had fallen chiefly under the influence of Athens. In the western regions, so

far as these were at all ripe for philosophy, Pythagoreanism, then in its first and most flourishing period, most probably hindered the spread of Platonism, despite the close relation between the two systems' (*Plato and the Older Academy*, E. T. pp. 553 *seq.*). Zeller gives in a note a list of Plato's pupils, in which all the distinguished men of the School of Cyzicus are placed to the credit of the Academy.

between him and the mathematicians and astronomers of the school of Cyzicus.⁴³

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⁴³ Aristotle was born in the year 384 B.C., and went to Athens 367 B.C.: after the death of Plato (B.C. 347) Aristotle left Athens and went to Atarneus in Mysia, where his friend Hermias was *dynast*. When he was there he may have renewed his relations with the distinguished men of the School of Cyzicus, which was not far distant. It is quite possible that

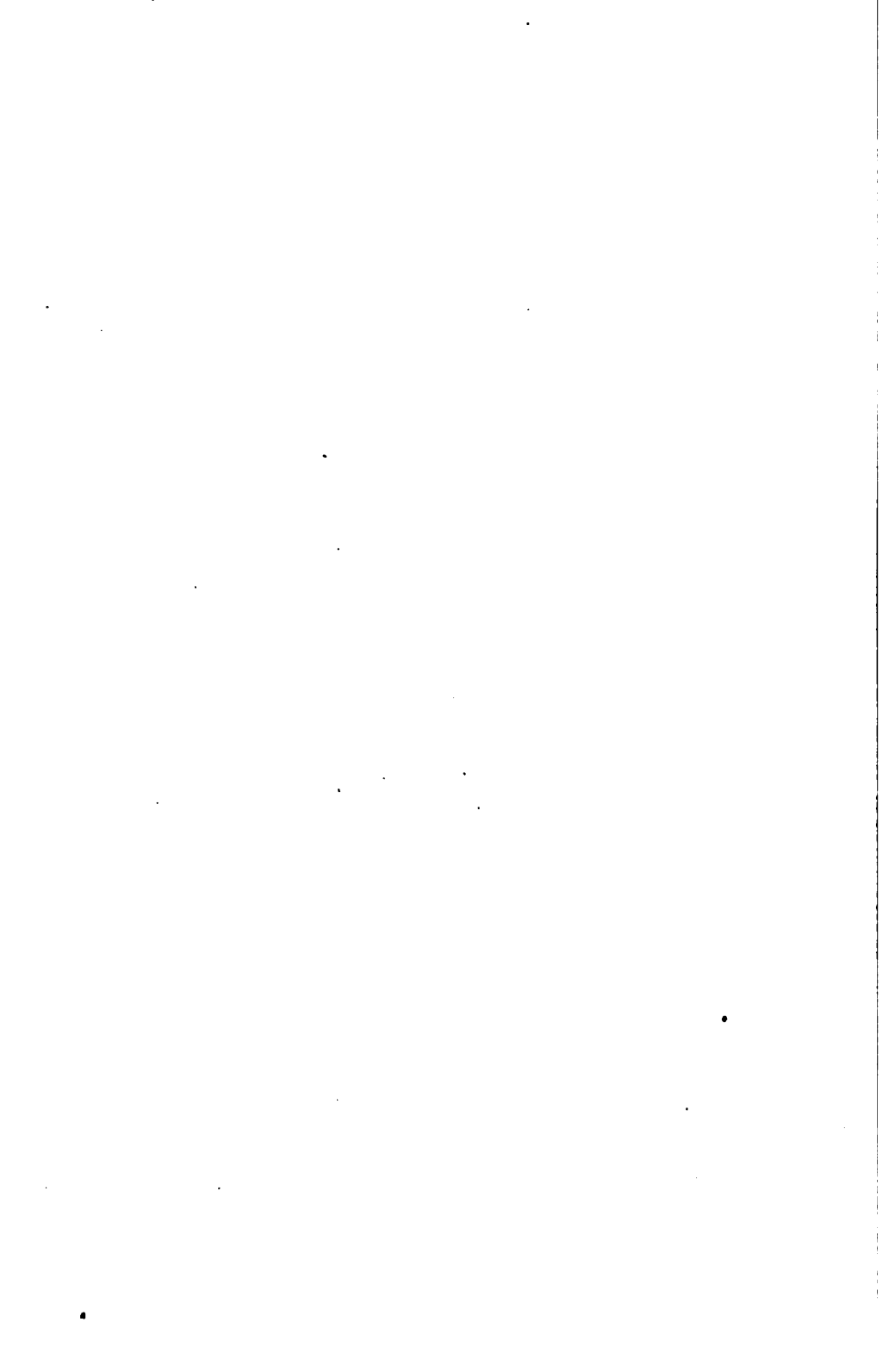
Menaechmus may have been recommended as mathematical teacher to Alexander the Great by Aristotle; and we have seen that Polemarchus, who was known to Eudoxus, and Callippus of Cyzicus, who was a pupil of Polemarchus, went together to Athens to hold a conference with Aristotle on the hypothesis of Eudoxus, with the view of rectifying and completing it.

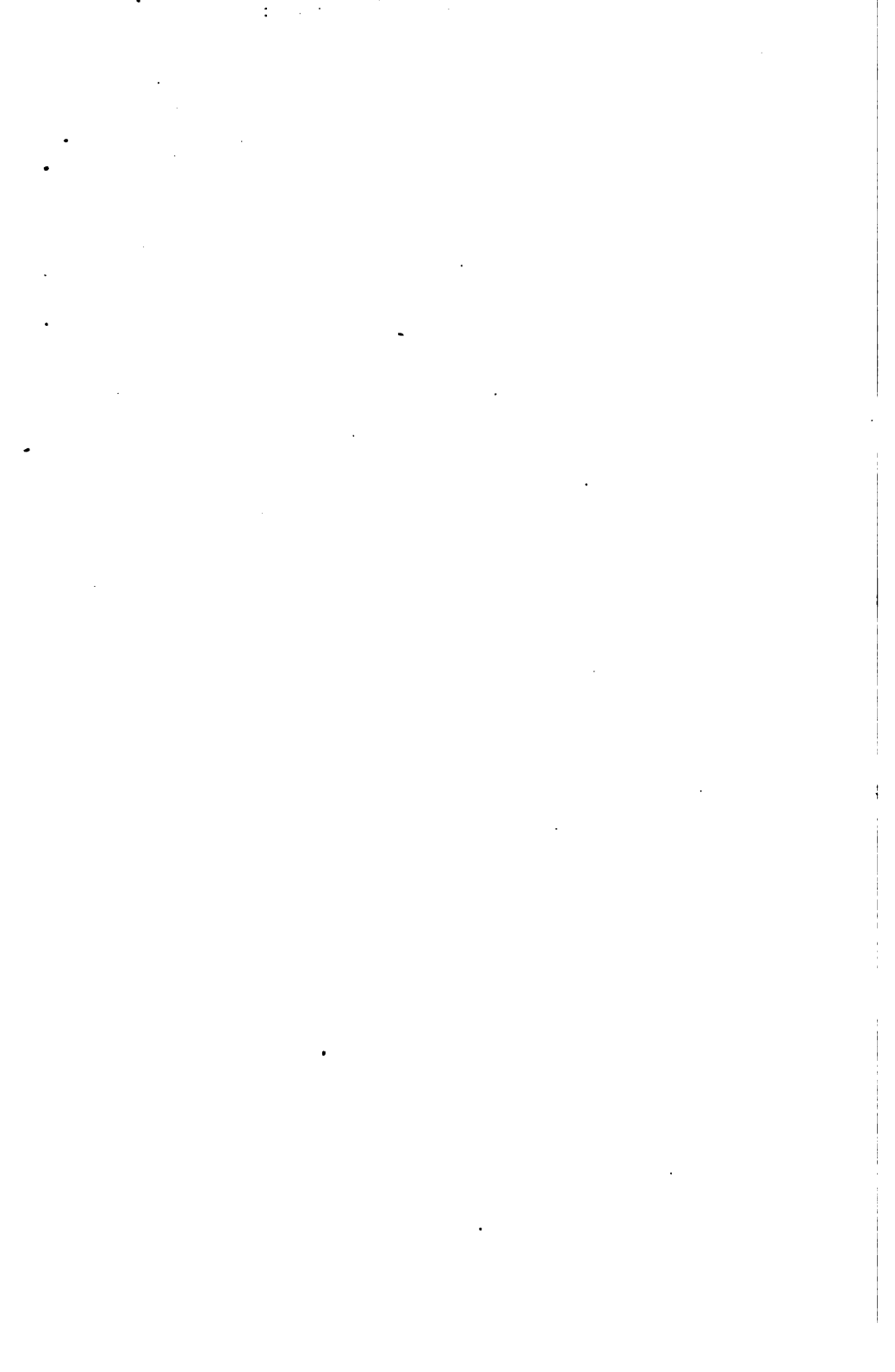
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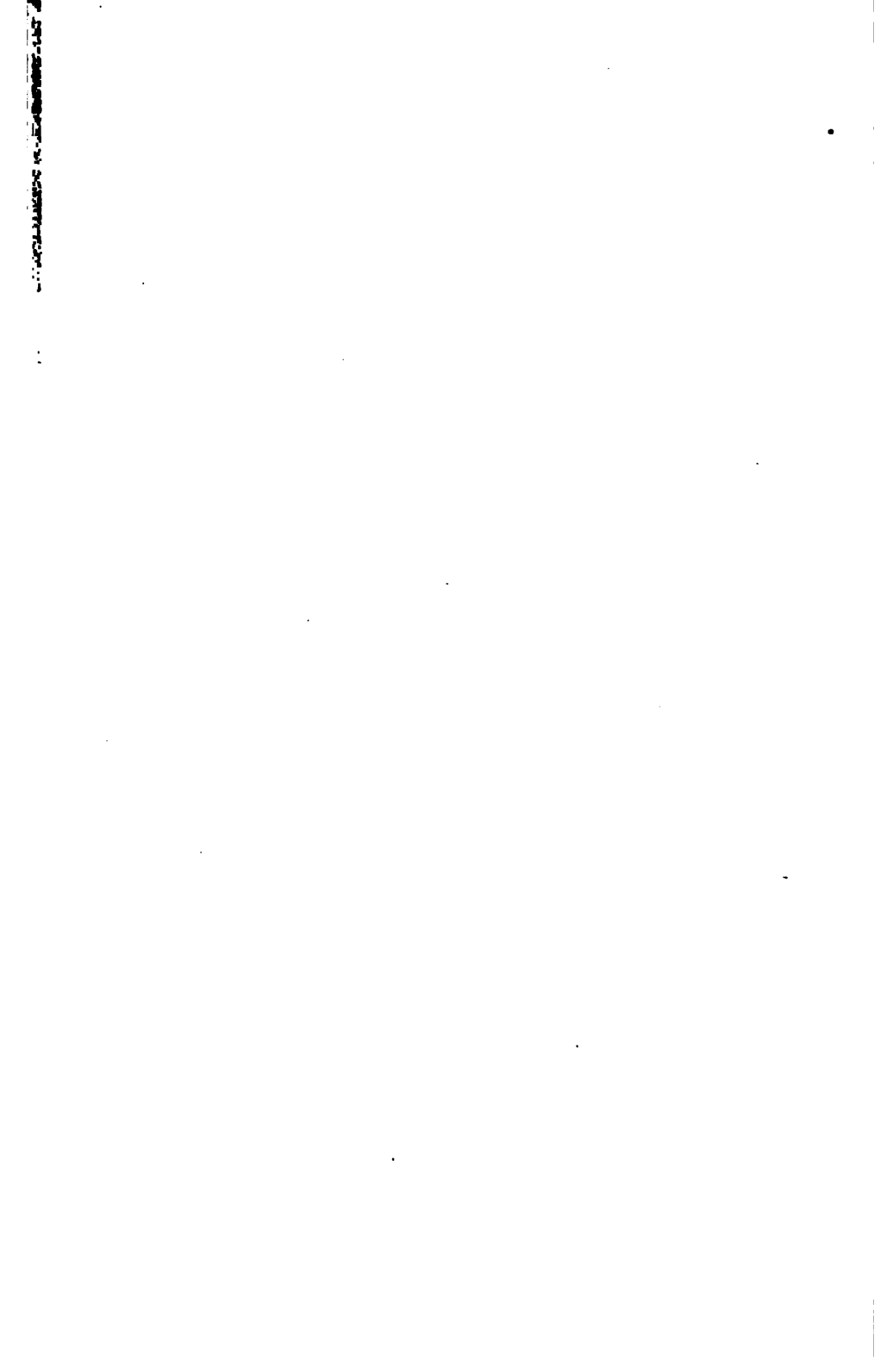
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- I. On Two Fragments of a Greek Papyrus.
 - II. On the Elision of Words of Pyrrhic Value in the Greek Tragics.
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 - IX. The Bucolics of Calpurnius and Nemesianus.
 - X. The Cross References in the 'Philosophumena.'
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-

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